

27700

NATIONAL LIBRARY
OTTAWA



BIBLIOTHÈQUE NATIONALE
OTTAWA

NAME OF AUTHOR.....M. G. DUFF.....

TITLE OF THESIS...NORTH-AMERICAN...C.C...IN SERVICE...

...ADULT...EDUCATION...

UNIVERSITY...ALBERTA.....

DEGREE FOR WHICH THESIS WAS PRESENTED...PH.D.....

YEAR THIS DEGREE GRANTED...1976.....

Permission is hereby granted to THE NATIONAL LIBRARY
OF CANADA to microfilm this thesis and to lend or sell copies
of the film.

The author reserves other publication rights, and
neither the thesis nor extensive extracts from it may be
printed or otherwise reproduced without the author's
written permission.

(Signed).....

PERMANENT ADDRESS:

...3524...100 St.....

...Edmonton.....

DATED...April 20...1976...

NL-91 (10-68)

INFORMATION TO USERS

THIS DISSERTATION HAS BEEN
MICROFILMED EXACTLY AS RECEIVED

This copy was produced from a microfiche copy of the original document. The quality of the copy is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

Canadian Theses Division
Cataloguing Branch
National Library of Canada
Ottawa, Canada K1A 0N4

AVIS AUX USAGERS

LA THESE A ETE MICROFILMEE
TELLE QUE NOUS L'AVONS RECUE

Cette copie a été faite à partir d'une microfiche du document original. La qualité de la copie dépend grandement de la qualité de la thèse soumise pour le microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

NOTA BENE: La qualité d'impression de certaines pages peut laisser à désirer. Microfilmée telle que nous l'avons reçue.

Division des thèses canadiennes
Direction du catalogage
Bibliothèque nationale du Canada
Ottawa, Canada K1A 0N4

THE UNIVERSITY OF ALBERTA
META-EVALUATION OF IN-SERVICE PROGRAMS
FOR ADULT EDUCATION

by
DONALD WINSOR MANUEL 

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE
STUDIES AND RESEARCH IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY
IN
EDUCATIONAL PSYCHOLOGY
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA
SPRING, 1976

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Meta-Evaluation of In-Service Programs for Adult Education," submitted by Donald Winsor Manuel in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Educational Psychology.

V. R. Myers
Supervisor

Thomas Kieren

Joseph

Mitchell

Lawrence A. Baker
External Examiner

Date . . . January 5, 1976

ABSTRACT

The rapid increase in the number of new instructional staff at post secondary institutions, who for the most part do not have certifiable pedagogical expertise, has led to the problem of providing in-service pedagogical programs. The essential purpose of this study was to evaluate a system of evaluation for these in-service modular programs. This second order evaluation is termed meta-evaluation.

To carry out this study it was necessary to embark on five sequential phases of methodology: 1) develop a sample of modules of in-service curriculum, 2) prepare an operational evaluation model, 3) deliver the modules of in-service instruction, 4) use the evaluation model to evaluate the performances of the in-service curricula, and 5) report on the meta-evaluation.

Two sample modules of curricula were developed. They were called the Adult Learning module and the Psychomotor Learning module. For the preparation of the operational evaluation model the Stake Model of Curriculum Evaluation was adopted. Many instruments had to be developed. A pilot study was conducted at Algonquin College in Ottawa to provide feedback for refinement of the modular content and the data collection instruments.

The two modules were each taught to two different groups of representative instructors from the Northern Alberta Institute of Technology (N.A.I.T.) and all pertinent data for the evaluation model was collected. This data was summarized and prepared for presentation to a "blue chip" group of judges from N.A.I.T. This group of decision makers - (five Department Heads from N.A.I.T.) were instructed to process the data through the judgement matrix of the operational evaluation model; in essence, they made decisions with respect to the success of the two sample in-service modular programs. It was observed that in fact this judgement group did arrive at consensus decisions.

The meta-evaluation portion of the study constituted the assessment of the success of the evaluation model employed. This assessment was done by the five decision makers with the aid of an instrument which asked for the rating of the operational model on eleven criteria.

The results of the study showed that the evaluation model did function; that consensus and meaningful decisions could in fact be made by applying the model. The results of the assessment also showed various places where the sample could be improved. Results as to the main purpose of the study (meta-evaluation) showed that the model was rated high on ten of the eleven criteria.

There were many recommendations; however, the essence of all recommendations can be summarized by the following two: 1)

that this operational evaluation model based on Stake's Model be employed to evaluate modular in-service curricula, with the initial major emphasis on the refinement of instrumentation and the development of relevant data bases for further and wider application; and 2) that this evaluation model should be employed in adult learning contexts as a negotiation tool for the "on the spot" development of curriculum and subsequent evaluation of curriculum.

TABLE OF CONTENTS

	Page
List of Tables	x
List of Figures	xii
Chapter	
I. THE PROBLEM	1
Statement of the Problem	5
Purpose of the Study	6
Delimitations of the Study	7
Theoretical Framework of the Model	8
Summary	11
II. REVIEW OF THE LITERATURE	12
Curriculum Evaluation Defined	12
Curriculum Evaluation Theories	14
Curriculum Evaluation Models	19
Stake's Model	33
Meta-Evaluation	41
Summary	46
III. METHODOLOGY	47
Development of the Sample Modules	48
The Selection of Modules for the Sample	48
The Preparation of Modules	52
Preparation of the Evaluation Model	54
The Rationale	54
Cell #1 (Intended Antecedents)	55
Cell #2 (Observed Antecedents)	55
Cell #3 (Intended Transactions)	56
Cell #4 (Observed Transactions)	56
Cell #5 (Intended Outcomes)	57
Cell #6 (Observed Outcomes)	57
Delivering Modules of In-Service Instruction at N.A.I.T.	59
Using the Evaluation Model	60
Cells #7,9 & 11	61
Cells #8,10 & 12	62
Results of the Meta-Evaluation	63
Summary	64
IV. THE PILOT STUDY	65
Samples (Antecedents)	65
Transactions	69
Results (Outcomes)	72
Summary	78
V. THE RESULTS	80
Curriculum Development of Sample Modules	80

Preparation for Delivery of Instruction	81
The Rationale	81
Intended Antecedents (Cell #1)	83
Intended Transactions (Cell #3)	86
Intended Outcomes (Cell #5)	86
Report on the Delivery of Curriculum Modules	87
Observed Antecedents (Cell #2)	87
Observed Transactions (Cell #4)	88
Observed Outcomes (Cell #6)	95
Use of the Evaluation Model	98
Results of the Meta-Evaluation	106
Summary	108
VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	110
Summary of the Study	110
Conclusions	114
Recommendations	119
Specific Recommendations	119
General Recommendations	120
BIBLIOGRAPHY	122
APPENDIX A	126
Adult Learning Module	126
Objectives	127
Assigned Reading References	129
Bibliography	156
Pre Test (Form C)	159
Post Test (Form D)	169
APPENDIX B	177
Psychomotor Learning Module	177
Objectives	178
Assigned Reading References	181
Bibliography	182
Pre Test (Form A)	185
Post Test (Form B)	199
APPENDIX C	213
Curriculum Bibliography	214
APPENDIX D	217
Data Collection Instruments	217
General Biographical Information	218
Paired Comparison Instrument (Adult)	220
Record of "Out of Class" Activities (Adult)	224
Record of "Out of Class" Activities (Psychomotor)	225
Skill Learning - A Rating Scale	226
Adult Learning - A Rating Scale	227
APPENDIX E	228

Judgment Meeting Handouts	228
Evaluation Theories and Models	229
The Rationale	236
Objectives for Adult Learning Module	238
Objectives for Psychomotor Learning Module	240
Antecedents (Intended and Observed)	243
Transactions (Intended and Observed)	248
Outcomes	250
Judgment Instruments	253
APPENDIX F	257
Meta-Evaluation Instrument	258

LIST OF TABLES

Table

Page

1. Numbers of Instructional Staff at N.A.T.T.	2
2. Scale Values for Combined Group	50
3. Scale Values for Separate Group	51
4. Summary of Age of Sixteen Subjects in Adult Learning Module	66
5. Summary of Educational Experience Beyond High School of Sixteen Subjects in Adult Learning Module	67
6. Summary of Teaching and Other Work Experience of Sixteen Subjects in Adult Learning Module	67
7. Summary of Age of Seven Subjects in Psychomotor Learning Module	68
8. Summary of Educational Experience Beyond High School of Seven Subjects in Psychomotor Learning Module	68
9. Summary of Teaching & Other Work Experience of Seven Subjects of Psychomotor Learning Module	69
10. Summary of Observations of In-Class Transactions for Adult Learning Module	70
11. Summary of Observed "At Home" Transactions for Adult Learning Module	71
12. Summary of Observations of In-Class Transactions for Psychomotor Learning Module	71
13. Summary of Observed "At Home" Transactions for Psychomotor Learning Module	72
14. Results on Cognitive Objectives for Adult Learning Module (Correlated T Test)	73
15. Results on Cognitive Objectives for Psychomotor Learning Module (Correlated T Test)	74
16. Pre and Post Ratings for Adult Learning Module From Likert Scale Instrument	75
17. Pre and Post Ratings for Adult Learning Module From Paired Comparison Instrument	77
18. Pre and Post Ratings for Psychomotor Learning Module From Likert Scale Instrument	78
19. Description of Characteristics of Intended Clientele For Both Modules	85
20. Description of Characteristics of the M-W Group of Clients	89
21. Description of Characteristics of the T-R Group of Clients	90
22. Observed Transactions of M-W Group for Adult Learning Module	91
23. Observed Transactions of T-R Group for Adult Learning Module	92
24. Observed Transactions of M-W Group for Psychomotor Learning Module	93
25. Observed Transactions of T-R Group for Psychomotor Learning Module	94

26. Results on Cognitive Objectives By the Two Groups of Subjects for Adult Learning Module (Correlated T Test)	96
27. Results on Cognitive Objectives By the Two Groups of Subjects for Psychomotor Learning Module (Correlated T Test)	97
28. Scale Values & Correlations From Likert Instruments for Adult Learning Module	99
29. Scale Values & Correlations From Likert Instruments for Psychomotor Learning Module	100
30. Estimate of Congruence for Both Modules	102
31. Judgments for Both Sample Modules of Curriculum ...	105
32. Results of Meta-Evaluation (Likert Scale)	107

LIST OF FIGURES

Figure	Page
1. A Layout of Stake's Model	9
2. A Transactional Model of Curriculum Evaluation	22
3. Uffelman's Model for Analyzing and Comparing Instructional Strategies and Programs	23
4. The CEMREL Evaluation Model	24
5. Four Phases of the CIPP Model	26
6. The Relationship of Evaluation to Decision Making ..	28
7. A Theoretical Evaluation Model	29
8. Evaluation Stages	30
9. Design Criteria	32
10. A Representation of the Processing of Descriptive Data	35
11. A Representation of the Process of Judging the Merit of an Educational Program	38
12. Comparative Profile Showing Dissonance	40
13. Five Designs for Meta-Evaluation	43

CHAPTER I

THE PROBLEM

Institutions of post secondary education have recently been increasing in number and size. The numbers of trade, technical and adult basic education programs offered by these institutions have shown phenomenal growth. Pre 1960 enrollments in post secondary programs were relatively low and characterized by steady rates of increase. With the inception of the Technical Vocational Training Assistance Act of 1960 enrollments in trade, technical and adult basic education programs have been increasing rapidly. Evidence of this rapid rate of expansion can be easily seen when, for instance, we examine the figures for numbers of instructional staff at the Northern Alberta Institute of Technology (N.A.I.T.) for the past fourteen years. Table 1 shows these figures.

Rapid expansion at post secondary institutions has resulted in the hiring of many new instructors who first have expertise in a trade or discipline, and secondly, who demonstrate an ability or a potential ability to teach. Certification of pedagogical competence has not been a requirement for employment.

Table 1

Numbers of Instructional Staff at N.A.I.T.

Year	No. of Staff	Year	No. of Staff
1962	50	1969	398
1963	144	1970	409
1964	190	1971	421
1965	238	1972	475
1966	292	1973	494
1967	372	1974	538
1968	389	1975	569

Accompanying the fact that large numbers of new instructors are employed each year is the added phenomenon that in most trade and technology programs there has been demonstrated need for much curriculum development and re-development. Not only has rapid technological change placed a demand upon the curriculum developers to keep content valid; but additional demands have been made upon instructors to incorporate pedagogical changes, especially in the direction of providing for flexible and accelerated training programs. The offering of competency based programs has become the goal of most institutions and adds yet another dimension to the "new" skills required for instructional staff. In summary, the restructuring of content and instructional processes has become a week to week responsibility of virtually all instructors in the majority of technically oriented post secondary institutions.

Many post secondary institutions have recognized the need for instructional staff to improve their instructional and curriculum development skills. Sabbatical and other educational leaves attempt to fill this need but fall short of the mark. There are too few leaves available (2-4% of staff complement annually is average) and a considerable number of instructors at the technical institutions are unable to utilize these leaves for improving instructional expertise because they do not have the necessary "academic qualifications" to be permitted registration in faculties of education at universities, which is where these competencies are traditionally developed. Estimates of the number of instructors at N.A.I.T., for instance, who could not utilize leaves for development of pedagogical skills or certification of same, range between thirty and forty percent of the total instructional staff.

In-service programs (operated in-house) are considered to be one answer to the problem. N.A.I.T. is representative of an institution which is attempting to meet the challenge in this way. In addition to a program of pre-service orientation and a mandatory in-service program for first year employees, N.A.I.T. is planning a permanent in-service program designed for all instructors to participate on a volunteer basis. Incentive for volunteer participation is provided by advancement on the pay matrix.

Other post secondary institutions in Alberta and Canada

are at various stages of identifying their needs and/or attempting to meet the challenge presented by these needs.

There will be a stage in the independent development of in-service programs at various institutions when the sharing of plans and programs will be beneficial. One way of maximizing the relevance of the in-service curricula, and also making implementation an easier task, is to involve in-house personnel in the planning and implementation activities. Portions of curricula developed at one institution would be adaptable and useful at other institutions, but only if they are made operational by in-house involvement at the borrowing institution with due concern for specific institutional inputs.

The need for evaluation of these in-service programs is important on two accounts. First, formative evaluation must be carried out because of the uniqueness of programs at each institution; and second, if efficient utilization of new curricula and processes is to come about, both at the developing institution and at a borrowing institution, there must be the ability to measure the success at various stages of implementation. The most impelling reasons for the need to evaluate in-service programs come about from the unique nature of the programs which are required to meet extremely divergent needs of the clients of these programs. The clients of these programs are the individual members of the instructional staff of the institutions. This group of clients is characterized by extreme

divergence in expertise and interests which comes about from a large degree of variance in: amount and kind of formal education; years of work experience; age; area of content expertise (whether it be trade, technology or engineering occupations); and amount and kind of pedagogical experience.

Individualizing the learning processes is an imperative long range goal of relevant in-service programs, and because of the large quantity of resources which need to be committed, the efficiency of the programs will in all likelihood be closely examined by authorities in control of operating budgets.

Statement of the Problem

The problem is that at the present time, with the rapid increase in the number of new instructional staff at post secondary technical institutions, there is a need to rapidly develop operational in-service programs directed at improving pedagogical skills. The problem is compounded by the following factors: 1) large numbers of new instructional staff are hired each year and many have no certifiable pedagogical skills, nor is much regard given to academic background when hiring, but rather the major emphasis is on technical competence; 2) these large numbers of new instructors have to assimilate into the programs and procedures of the various individual institutions and

departments; 3) curricula are changing rapidly both in content and processes; and 4) no useable model for the development and monitoring of in-service programs is currently available.

Purpose of the Study

The essential purpose of the study was to develop a sample of in-service curriculum and an operational model to evaluate the performance of these in-service modules with instructional staff at post secondary institutions. This latter purpose amounts to an evaluation of an evaluation process. In recent literature the term "meta evaluation" has evolved to describe the processes of evaluating an evaluation activity. No operational model was found for this task, and this study was designed to meet this unique problem.

Many factors were operative at the onset of this study, the most significant factor being that most institutions surveyed were at least at the preliminary planning stages in the development of a viable in-service program. N.A.I.T. was identified as one institution significantly committed to the development of some form of continuing in-service program so as to be receptive to the purpose of this study. Algonquin College in Ottawa was also identified as receptive and subsequently was utilized in a pilot study.

Because of the formative stages of in-service programs at most institutions, the purpose of this study had to be specifically concerned with the following sequence of requirements:

- 1) develop a sample of modules of in-service curricula.
- 2) prepare an operational evaluation model.
- 3) deliver modules of in-service instruction.
- 4) use the evaluation model to evaluate the performance of the in-service curricula.
- 5) evaluate the evaluation by reporting on the results of the meta-evaluation (effectiveness of the operational evaluation model for evaluation of modules of in-service curricula).

Delimitations of the Study

Major delimitations are:

- 1) only one major institution (N.A.I.T.) was involved in the development of the operational model.
- 2) only a sample of the in-service curriculum at N.A.I.T. was developed and evaluated. One intention of N.A.I.T.

is to have the curriculum modularized to provide many points of entry and exit. This design would allow the development for complete curriculum for each module as a separate entity, and the design of this study was to develop a sample of two modules of content within the curriculum. The selection of which two modules to be developed within this study was based on results from a study previously conducted at N.A.I.T. The section of this study on methodology (Chapter III) describes the procedures and criteria utilized for this selection, and also makes direct reference to the pilot study conducted for this purpose. The two modules selected were "Psychomotor Learning" and "Adult Learning".

3) time credit restrictions suggested as necessary by the personnel department of N.A.I.T. for the in-service program delimited the length of time devoted to instruction for each of the selected modules of curricula.

Theoretical Framework of the Model

The main purpose of this study was to develop an operational model to evaluate the performance of the sample in-service modules, and to be utilized by various post secondary institutions in the future to evaluate in-service curricula. The core of this operational model is based on the curriculum

evaluation model by R.E. Stake (1967). Stake's model is depicted in Figure 1.

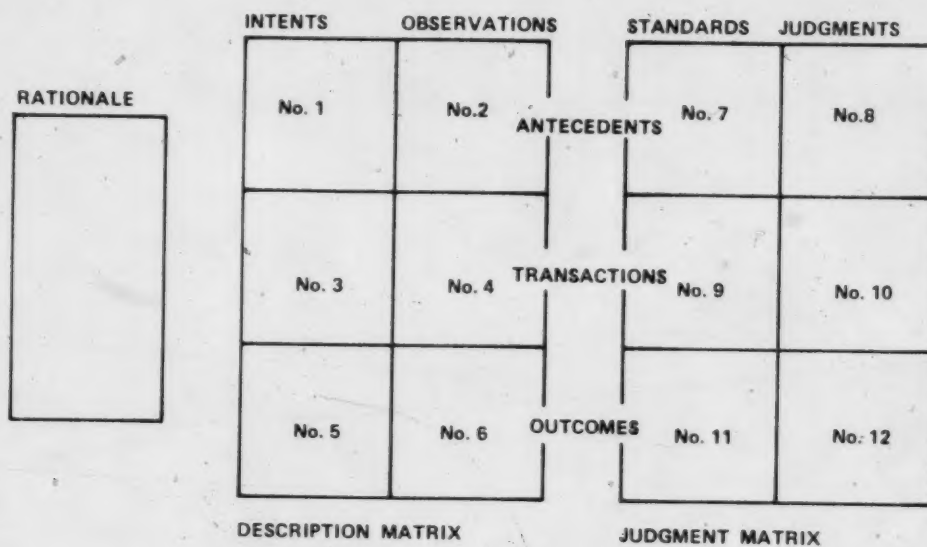


Figure 1. A Layout of Stake's Model

The intent of this study was to use the classification of data depicted by Stake's model to guide the phases involved in the development of the "operational model". The additional parts, as it were, in the operational model will be those guidelines (e.g., selection of appropriate committees, etc.) found to be necessary to guide the decisions in the specific tasks related to the development of the in-service program at any specific institution, with its specific intents, and suggested procedures which allow for the generalization to other institutions with

10
different intents.

The selection of Stake's model is briefly rationalized at this time, and is dealt with in more detail in the review of literature (Chapter II). Stake's model is more applicable than others because of the developmental tasks involved in the study where many unique inputs are anticipated. Stake's model, an eclectic model, best ensures that the right questions and all the questions are asked. Mackay and Maguire (1971, p.16) aptly demonstrate this point.

In summary, it is useful to highlight three kinds of models of evaluation. Each reflects the background and concerns of its authors. Neo-Tylerian models such as Walbesser's focus on the learning process and the sequences of objectives necessary for achievement. The role of evaluation is primarily formative. The eclectic models, like Stake's focus on the collection of data both to answer and to raise questions. Administrative models, like Stufflebeam's are closely tied to the collection of information for particular decisions.

Stake (1967) stresses the importance of collecting data from a wide range of sources. He points out that data are divided into two dimensions: one dimension separates the data into descriptions and judgments; the other dimension classifies data into antecedent, transaction and outcome. Determining the degree of relationship and agreement among the various classes of data amount to the total evaluation necessary.

In the review of literature (Chapter II) additional perspective into the concepts and procedures of Stake's model

will be presented by examining the data processing procedures for the "descriptive matrix" and the "judgment matrix". In addition Stake's Model is analyzed in detail in relationship to other evaluation models.

Summary

In this chapter the problem has been identified with emphasis on the need to develop an evaluation system for in-service pedagogical programs. The purpose of the study was outlined in terms of five major criteria required to confront the problem in its formative and unique context. In addition this chapter outlined the delimitations of the study, and presented a brief outline of the theoretical framework of the evaluation model to be employed.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter reviews the literature relevant to: the definition of curriculum evaluation, curriculum evaluation theories, curriculum evaluation models, Stake's Model of curriculum evaluation, and meta-evaluation. Stake's Model, which forms the foundation for the operational model of this study, is described in detail and criticized in comparison with other models. The relatively new concept known as meta-evaluation is discussed with a view to identifying procedures to be employed in this study for the purpose of conducting a meta-evaluation with the operational model.

Curriculum Evaluation Defined

Many educational writers would approach the problem of defining "curriculum evaluation" by concentrating firstly on the definition of curriculum. Obviously, this would reveal a wide ranging discussion as to the extent of the required detail, ranging from a broad set of definitions as representative of Taba (1962) to a rather specific definition of curriculum

representative of Gagne's (1965) thinking. Rather, it makes for better clarity in the end to define "curriculum evaluation" as a whole with the emphasis on the term evaluation.

According to Guba and Stufflebeam (1970) a definition for evaluation must be based on a set of premises, and they identify five premises. These are: 1) to evaluate it is necessary to know what decisions are to be served, 2) different strategies are required for different settings, 3) different types of decisions require different types of evaluation designs, 4) a single set of generalizable steps can be followed in the design of any specific sound evaluation, and 5) evaluation criteria must satisfy both scientific adequacy and practical utility. They go on to state specifically that "Evaluation is the process of obtaining and providing useful information for making educational decisions" (p.15). Six key terms are identified by Guba and Stufflebeam (1970) and the importance of these terms to the definition is stressed. These terms are: "process" (defined as a particular activity involving a number of steps or operations), "obtaining" (defined as making available through such processes as collecting or reporting), "providing" (defined as fitting together in systems), "useful" (defined as appropriate to agreed upon criteria), "information" (defined as descriptive or interpretive data about entities), "education decisions" (defined as choices among alternatives), with "decision" being the key term in the entire definition of evaluation.

The stress on the word "decision" when defining curriculum evaluation is also supported by Cronbach (1972). He has identified three useful functions that evaluation performs, each relating to the importance of decisions. They are: 1) decisions for course improvement, 2) decisions about individuals to better identify the needs of learners, and 3) decisions about the worth of an educational system and of its instructional staff.

Along a similar vein Taylor and Maguire (1972, p.89) identify the importance and emphasis on decisions in curriculum evaluation when they state:

Curriculum evaluation can be viewed as a process of collecting and processing data pertaining to an educational program, on the basis of which decisions can be made about that program. The data are of two kinds: (1) objective descriptions of goals, environments, personnel, methods and content and immediate and long range outcomes; and (2) recorded personal judgments of the quality and appropriateness of goals, inputs and outcomes. The data - in both raw and analyzed form - can be used either to delineate and resolve problems in educational programs being developed or to answer absolute and comparative questions about established programs.

Curriculum Evaluation Theories

To turn attention away from the mere definition of

curriculum evaluation towards the processes of curriculum evaluation, we examine some of the thoughts of Taylor and Cowley (1972). They state the history of curriculum evaluation is easily subdivided into three eras: pre 1930's, the Ralph Tyler era, and the present era. Each of these era's display their own character. Characterizing the first era "evaluation was equated almost exclusively with the administration of standardized tests. Comparisons, when these were appropriate, were made between two groups or between a target group and a set of norms" (p.1). The second era was dominated by a model established by Ralph Tyler and his associates, and was characterized "by its stress on stating objectives behaviorally and a lack of stress on valuing the objectives themselves" (p.4). The characterization of "the present era of evaluation has been the attempt by several writers to formulate a conceptual framework for curriculum evaluation" (p.4). It is within this present era of curriculum evaluation that the various current models of evaluation are unfolding. They are many, and each has its own uniqueness, but they all concern themselves with something more than "testing", and they all recognize the role of judgmental functions.

To set the stage for the full understanding of the range and kinds of evaluation models that were reviewed it is important to examine the contribution of Scriven (1967) in establishing order in the terminology and definition of curriculum evaluation. His contribution is greatest in the theory of evaluation while leaving it to others to develop the practical

framework (models) to put this evaluation theory into practice.

Scriven states that particular attention must be paid to the distinction between goals of education and the role of education. The goals are relatively easy to identify and "this activity consists simply in the gathering and combining of performance data with a weighted set of goal scales to yield either comparative or numerical ratings" (Scriven, 1972). He goes on to point out that the role to which evaluation is directed is enormously varied and constitutes the major concern when designing an evaluation activity.

Scriven also deals directly with the distinction between formative and summative evaluation: formative evaluation refers to the evaluation of programs while they are being developed, while summative evaluation refers to the evaluation of programs that are already in use. The major implication of the distinction between these two forms of evaluation relates to the roles of the evaluation personnel. For formative evaluation the evaluator must work closely with the curriculum builder (sometimes these two functions are carried out by the same personnel), while for summative evaluation the evaluator must be independent and free of any potential stigma or conflict of interest.

Like Cronbach, Scriven prefers non-comparative evaluation better to assess the merit of an entire program. He suggests that there are two differing approaches to evaluation.

One is "instructional" and the other is "consequential". The first concentrates on the content, goals and processes; while the second approach examines the effect that the program has on the learner. He recommends that the evaluation be planned to take advantage of both of these two approaches.

In his criticism of B.S. Bloom and others, Scriven (1967) insists that the evaluator not only apply specific scientific criteria and methods for evaluation but also exercise value judgments and determine their appropriateness to the specific tasks at hand. In reference to evaluation of higher education, Scriven (1973) supports earlier statements by identifying some of the major benefits that can accrue from interaction between the evaluation system and the system being evaluated. This is in full support of that kind of evaluation classified as formative evaluation.

Recent work by Scriven (1974) in relationship to evaluation of competency based education attacks the problem of the worth of considerable effort involved in competency based education as compared with traditional approaches. His main concern centers around the need to examine all the new and unique aspects of competency based education; and at the same time, not lose sight of the program as a whole. The evaluation of the 'whole' would necessarily require the examination of cost effectiveness.

In conclusion of Scriven's major contributions to

curriculum development his influence on "Goal-Mediated" evaluation must be discussed. Paramount to this question is the necessity to distinguish and encourage three types of activities centering around the formulation of goals. Accordingly, it is essential that: "In the first place the goals as so far formulated should be regularly re-examined and modified in the light of changes in the actual activities,... Secondly, work should be begun on the construction of a test-question pool.... The third activity that should commence at some intermediate stage is that of getting some external judgment as to the cohesiveness of the alleged goals, the actual content, and the test question pool" (Scriven, 1972, p.36).

Post 1960 theorists generally emphasize the need to look beyond the evaluation of end products into examining the processes and strategies of complex goals. Meese (1971) points out that several instruments have emerged more recently from curriculum projects which focus on process goals. One typical example of a curriculum project which focuses on process goals is Science - A Process Approach, designed by the American Association for the Advancement of Science Commission on Science Education (1969). This study is mentioned to demonstrate the point that instrumentation for process evaluation is being developed and utilized.

Generally, the emerging trend relative to refined thought on curriculum evaluation is representative of statements

made by Tuckman (1967) which emphasize four problems to "built in" evaluation. These include: 1) the problem of too tightly defined behavioral objectives which narrow the scope of data collected, 2) a concern for the lack of significant emphasis being placed on identifying the purpose for evaluation, 3) an oversight of the problem related to the dynamics of an ongoing learning activity, and 4) lack of expertise in collecting data which is simple and reliable and is at the same time general.

To sum up this section on curriculum evaluation theories the following quote from Atkin (1972, p.22) is presented as representative of the thinking of curriculum model builders of recent times.

It is universally accepted that evaluation should be central to course improvement. But only when evaluation is seen as facilitating rather than limiting function will it be utilized more effectively by curriculum developers. To achieve this end, a flexible approach to the role of evaluation must be fostered by evaluation specialists themselves; there must be willingness to question some of the conventional wisdom that has been accepted for decades, possibly with little analysis of the appropriateness today of the basic assumptions.

Curriculum Evaluation Models

Before launching into a description of current evaluation models it is interesting to note the solution to the problem of

selecting evaluation models for a major curriculum development and evaluation project (Borgen & Davis, 1970). It is interesting because they very quickly reject the earlier models. "Consultants, Sjogren and others, pointed out that the accreditation and Tylerian models have been applied most often in the past, but the appropriateness of these models for developmental efforts is limited," (p.37). Their main concern is simply that "the accreditation model applies arbitrarily arrived-at standards for judging a program and the Tylerian model focuses mainly on measuring the attainment of objectives, tending to ignore inputs and processes (p.37). The consultants to this project felt that "either a management-systems or a summative-composite model would be most appropriate for this developmental project," (p.37), and they go on to select the Stufflebeam (1968) model as the best management systems model; and the Stake (1967) model as the best summative-composite model.

This section will present and discuss several curriculum evaluation models, and then return to a detailed discussion of the Stufflebeam model (CIPP model) and the Stake model. The Stake model will also be examined for operational processes, as it forms the foundation of the operational model employed in this study.

Perhaps one of the first models to be formulated in the "new era of curriculum evaluation" is the model proposed by Taba and Savin (1962). This model demonstrates an intentional switch

in the focus of evaluation from the outcomes of learning to the process of learning.

A model which emphasizes the importance of stating objectives in identifiable behavioral responses by Tuckman (1967) is called "Curriculum Hierarchy for the Evaluation of Course Knowledge" (CHECK). The CHECK model dwells on the process of task analysis for the purpose of identifying hierarchical sets of objects, which in turn can be measured and the results compared to a control program. This model exhibits the narrowness of approach so strongly criticized by many of the authors of curriculum evaluation theory.

The Expected Opportunity Loss (E.O.L.) model described by Tanner (1970) concentrates on a complex set of procedures to determine program utility, program costs, and program selling price. It rates these factors on the basis of their expected contributions to the primary objective of the total program. It is not a traditional cost-effectiveness model, however, in that it places less emphasis on the cost components.

Parsons and Tenenberg (1970) examined the common "means-end" model of curriculum evaluation and reject it on the grounds that "the means-ends framework, in which the curriculum elements are means and changes in the pupils the ends, offers little assistance in formulating effective steps in introducing new curricula into ongoing school situations and insuring that appropriate curriculum elements are in fact instituted," (p.5).

They recommend a transactional model which is graphically displayed in Figure 2.

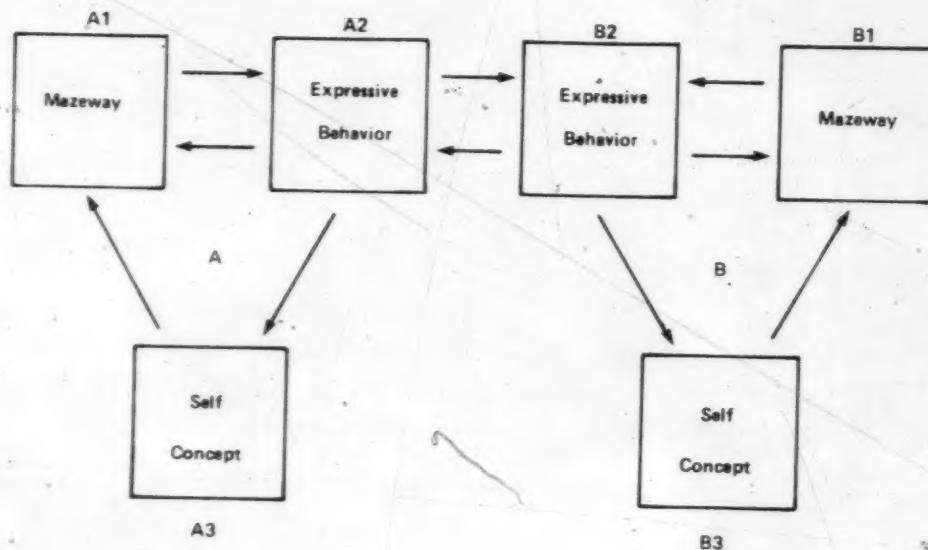


Figure 2. A Transactional Model of Curriculum Evaluation

It can be seen that the Parson and Tenenberq transactional model would be particularly useful for certain kinds of curriculum evaluation such as the one they studied ("Patterns in Human History"). The usefulness of this model in less human interaction content curriculum is questionable.

Another proponent of a curriculum evaluation model which concentrates on identifying the domain and level of difficulty for instructional objectives is Robert L. Uffelman. A

description of the model proposed by Uffelman (1970) is depicted in Figure 3.

I RATIONALE	Objectives	Cognitive; Factual Inferential Thinking Psychomotor Skills Affective Domain
	Learning Theory	Conditioning Cognitive Restructuring Identification
II CONTENT	Subject Matter	Substance Processes
III METHODS	Style	Directive Heuristic
	Interaction	Teacher ↔ Student Student ↔ Student Student ↔ Materials
IV MATERIALS	Type	Concrete Vicarious
V EVALUATION	Assessment	Learner Instruction Materials Program

Figure 3. Uffelman's Model for Analyzing and Comparing Instructional Strategies and Programs

This model permits the instructor to identify which psychological theory is acceptable to the philosophy of his school and the nature of the instructional data. The major weakness of this model is that it concentrates on outcomes (objectives) and ignores the necessity to examine the processes.

An interesting approach to the problem of data collection of processes activities in programs is recommended by Pahland (1970). He recommends the use of "enthography", the task of recording story-book-like accounts of hourly, daily or weekly activities of all participants in a program. He applied the skills of the enthographer in a conceptual model developed at the Central Midwestern Educational Laboratory (CEMREL Model). Figure 4 depicts the CEMREL evaluation model.

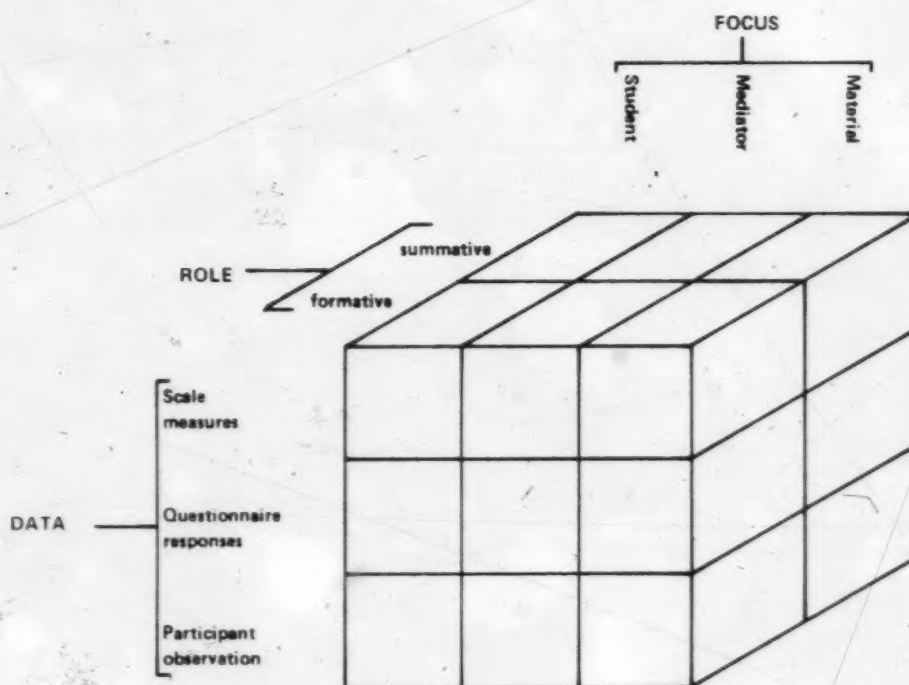


Figure 4. The CEMREL Evaluation Model

This model describes the roles of formative and

summative evaluation (the role); determines who the information is for (the focus); and identifies the kinds of data that should be collected (the data). Once the selection of a cell or cells has been achieved, then various data collection techniques are employed, including the process of ethnography. In this latter respect the CEMREL evaluation model is similar to the model proposed by R.E. Stake. Pahland stresses the unique importance of both hard data (collected with traditional tools) and soft data (collected by orthographical techniques). It must be kept in mind that orthographical data can only be analyzed with respect to the "whole" story, and as such tends to favour the summative evaluation role.

One of the more comprehensive models for curriculum development has been utilized by Daniel L. Stufflebeam. This model's main characteristic is that it is an administrative model in that it defines evaluation as the process of acquiring and using information for making decisions with respect to planning, programing, implementing and recycling program activities. Stufflebeam (1971,a) has labelled this model the CIPP Model after the four stages of evaluation. Figure 5 describes these four stages (Context, Input, Process and Product) in relationship to the "operations" that need to be carried out to utilize this model for either proactive or retroactive purposes.

(EVALUATION TYPES)				
	CONTEXT	INPUT	PROCESS	PRODUCT
O P E R A T I O N	System variables and values	Problem specifications Design criteria Constraints	Process decision points Milestones Barriers	Effectiveness criteria
	Performance and judgment data	Identification and analysis of strategies	Monitoring of procedures	Primary secondary, and tertiary effects
	Profile of needs, opportunities and problems	Strategies by problem matrix	Progress reports Exceptions reports	Description and explanation of project attainments and impact
	DELINEATE			
	OBTAIN			
	PROVIDE			

Figure 5. Four Phases of the CIPP Model

Stufflebeam explains the purposes of the four types of evaluation as they each pertain to delineation (of questions to be answered), obtaining (of relevant information) and providing.

(of information to decision makers). The purpose of context evaluation "is to systematically provide information that can be used by decision makers to make planning decisions regarding the establishment of new objectives, modifications of existing objectives, or confirmation of present objectives," (p.5). He goes on to state that the purpose of input evaluation is "to identify and assess alternative program strategies for achieving given objectives and to provide information to assist in detailing particular strategies," (p.8). "Process evaluation is designed to provide information during the implementation stages of a project or program" (p.9), and a secondary purpose, according to Stufflebeam, is to "provide a complete description of the actual program activities" (p.10). A final statement by Stufflebeam, with respect to purposes of evaluation stresses that simply stated "the purposes of product evaluation are to relate outcomes to objectives and to assess the overall of a procedure in terms of its effects" (p.11). To more fully understand the relationship of evaluation to decision making, an essential feature of an administrative evaluation model, Figure 6 should be examined.

The CIPP Model offers great promise of providing both external and internal validity to the evaluation process. Stufflebeam (1971,b) having great hope for this model, is confident that it is the best model available for evaluation of large scale projects when he states, "irrespective of the size of the evaluation effort or the magnitude of the decision making

processes involved, the CIPP model probably affords the most comprehensive conceptualization of education currently available" (p.28). However, he admits that the effort involved in using the model may only be worthwhile (have an effective pay off ratio) if in fact the evaluation task is great; this he concludes because of the need to adopt existing methodologic and/or develop new methods leaving a great deal of effort yet to be accomplished.

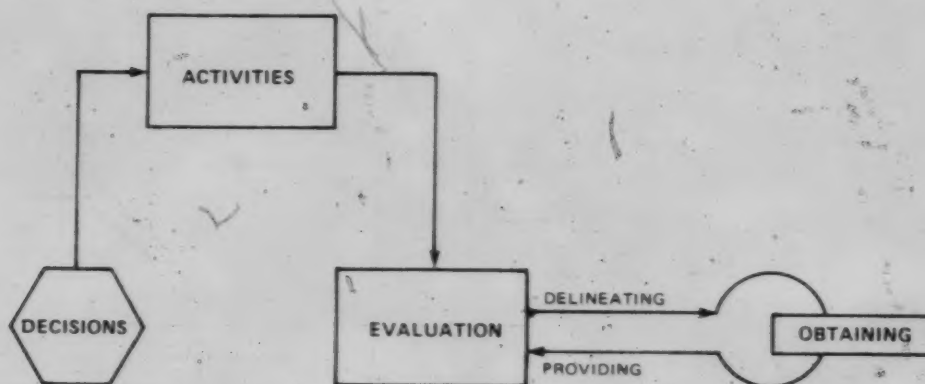


Figure 6. The Relationship of Evaluation to Decision Making

Additional concern regarding the feasibility of the CIPP Model, given current methodology, has been expressed in the Report of the Phi Delta Kappa Study Committee on Evaluation by Michael (1971). He identifies the feasibility problem as one of having to develop new methodology "especially in reference to the

context, input, and process components that tend to be somewhat more closely associated with formative evaluation than with product evaluation" (p.20). He is optimistic that these new methodologies will be developed, but notes that to a large extent they do not exist at this time (note: this conclusion was drawn in February, 1971).

The theoretical model proposed by Taylor and Maguire (1972), shown in Figure 7 is one of the first signs of real concern towards the problem of human judgments. The first publication of this article being in 1966, one year before Stake first outlined his model, and the manner with which judgments are treated suggest that it was a forerunner to Stake's Model, and

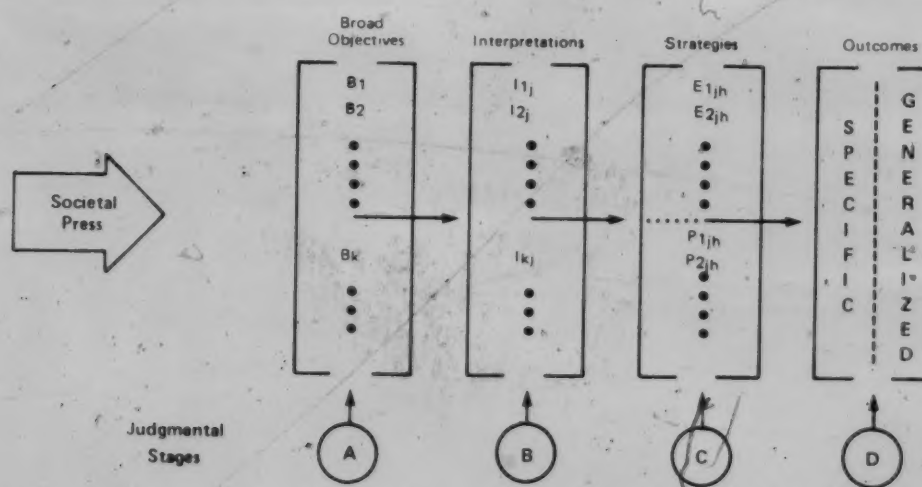


Figure 7. A Theoretical Evaluation Model

undoubtedly influenced its development. It, like Stake's Model, provides help to the curriculum developer to decide which are, for his purposes, the most pertinent questions to ask.

The application of the systems approach to evaluation is probably best represented by the Discrepancy Model of evaluation perfected by Provus (1972). In Figure 8 we can see the outline for the five stages of evaluation with an emphasis being placed upon standards.

Stage	Performance	Standard
I	Program Design Input Dimension Process Dimension Output Dimension	Design Criteria
II	Program Operation	Program Design Input Dimension Output Dimension
III	Program Intrim Report	Program Design Process Dimension Output Dimension
IV	Program Terminal Products	Program Design Output Dimension
V	Program Cost	Cost of Other Programs with Same Product

Figure 8. Evaluation Stages

In true application of the systems approach standards are not permanently established, but may be modified when feedback is received from the system in operation. Discrepancies are identified by locating differences between an established standard (at one particular time in the process) and actual achievement. Provus goes on to state that when significant discrepancy data are identified, four decisions are possible: a) continue to the next stage, b) redefine the program standards or processes and recycle, c) recycle to the first stage, or d) terminate the program.

The similarity between the Provus Model and Stake's Model is seen most vividly at Stage I (the design stage). Figure 9 displays the dimensions of the design criteria.

The similarity is demonstrated by the obvious likeness between the terms and their meanings for the following sequence in Provus's Model: inputs, process, and outputs; and the sequence in Stake's Model: antecedents, transactions, and outcomes.

The most apparent utilitarian weakness to the Provus model for purposes of this study is the fact that many inter-stage relationships exist that are difficult to sort out and/or predict unless the model is applied over many instances (i.e. allowed to function for a long time as a "systems" model

utilizing the feedback to modify standards and processes many times).

INPUTS	PROCESS	OUTPUTS
1. Variables-the things the program is attempting to change A. Student Variables B. Staff Variables C. Other Variables 2. Preconditions-the things that are pre-requisite to program operation yet remain constant throughout the program Student Conditions Staff Qualifications Administrative Support Media Facilities Time 3. Criteria must be specified for each input variable and precondition above. The criteria specified for student variables and preconditions constitute the selection criteria of the program.	Variables-those activities which change inputs into desired outputs A. Student Activities B. Staff Activities 1. Functions and duties 2. Communication a. Inter-staff b. With Others Criteria must be specified for each of the process variables	Variables-the changes that have come about A. Student Variables B. Staff Variables C. Other Variables Preconditions-same throughout the program Criteria are specified on the variables to define the goals of the program. The participant is released from the program if he achieves the goal of the program or if he violates a precondition.

Figure 9. Design Criteria

Up to this point this review of literature has described and criticized several curriculum evaluation models. None of these models was selected to provide the foundation for

the operational model of this study ~~because~~ of these noted criticisms. However, Stake's Model was selected to form this foundation, for, in the opinion of the researcher, it is best suited to providing a comprehensive framework, while at the same time being suited to the "low cost" (i.e. evaluation of individual modules of curriculum) application identified in this study. Following is a detailed set of descriptions and critiques of Stake's Model.

Stake's Model

In Chapter I of this study under the topic of "Theoretical Framework of the Model", Stake's Model was introduced. Figure 1 (Chapter I) provides the layout of Stake's Model, while mention was made of the separate importance of the "descriptive matrix" and the "judgment matrix". It would be helpful for clarification of the model to distinguish between antecedent, transaction, and outcome data. An antecedent, according to Stake (1966) is any condition existing prior to teaching and learning. Transactions are the countless encounters between teachers and students, students and students, students and other personnel and other sources of knowledge or other interfaces with an opportunity to react. The boundaries between what is antecedent data, and what is transaction data are not always totally clear. Outcomes are the data synonymous with achieved abilities, attitudes,

knowledges, skills and the like of students resulting from the educational experience. At the planning stage of an educational program (INTENTS) the boundaries and relationships between antecedents, transactions and outcomes must be specified.

Ideally there is a logical contingency between the three kinds of data. The specification of the intents for the three kinds of data would follow a pattern similar to: 1) expecting these antecedents, 2) and expecting these kinds of transactions, 3) these outcomes should be attained. However, they are not necessarily specified in the timeline sequence suggested by this description.

Examination within the descriptive matrix of Stake's Model helps clarify this relationship. This clarification can come about only by examining the processing activities that are played out in the descriptive matrix, which is represented in Figure 10.

Stake points out that there are two principal ways of processing descriptive data. These are: to determine the contingencies among the antecedents, transactions and outcomes; and to find the congruence between intents and observations. Contingencies are of two types, logical and empirical; the first type referring to the relationships that should exist, and the latter type referring to the relationships that are observed to exist. The establishment of logical contingencies is a question of expert judgment and is ideally determined at the planning

phase of all educational programs. Empirical contingencies are based on observations and are usually statistical problems of estimating the relationships among variables.

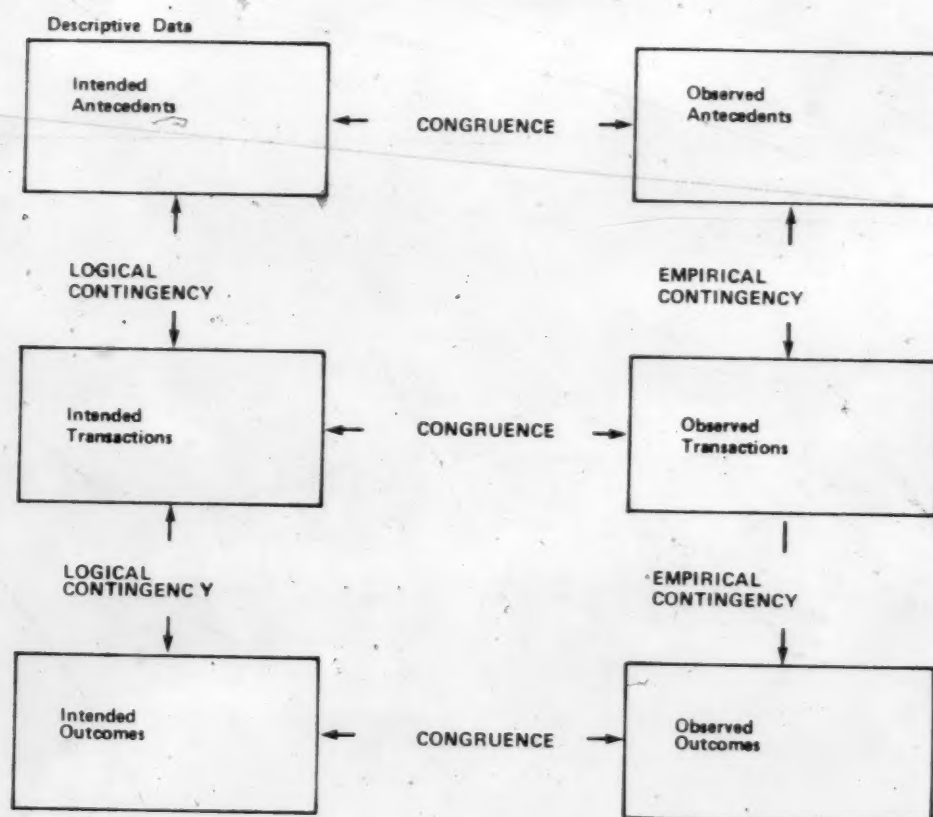


Figure 10. A Representation of the Processing of Descriptive Data

To have a high measure of congruence between the cells of the intended columns and the cells of the observed columns, the intended antecedents, transactions and outcomes would have to come to pass. Mackay and Maguire (1971) make significant statements in relationship to congruency by stressing two major points. "Firstly, it may be that incongruence is desirable in the long run, especially, if the intents can be shown to be invalid for some reason. Secondly, congruence does not assure validity, only fidelity" (p.31).

In describing the function of the judgment matrix, Stake (1967) states that there are two bases for judging the characteristics of a program, "1) with respect to absolute standards as reflected by personal judgments and 2) with respect to relative standards as reflected by characteristics of alternate programs" (p.532). Standards upon which to base the judgments will likewise have to come from either absolute sources (expert selection) or relative sources (other programs or norms). In the same article (1967, p.533) Stake elaborates on the processes of making judgments.

Before making a judgment the evaluator determines whether or not each standard is met. Unavailable standards must be estimated. The judging act itself is deciding which set of standards to heed. More precisely, judging

is assigning a weight, an importance, to each set of standards. Rational judgment in educational evaluation is a decision as to how much to pay attention to the standards of each reference group (point of view) in deciding whether or not to take some administrative action.

Relative comparison is accomplished in similar fashion except that the standards are taken from descriptions of other programs. It is hardly a judgmental matter to determine whether one program betters another with regard to a single characteristic, but there are many characteristics and the characteristics are not equally important. The evaluator selects which characteristics to attend to and which reference programs to compare to.

From relative judgment of a program, as well as from absolute judgment we can obtain an overall or composite rating of merit (perhaps with certain qualifying statements), a rating to be used in making an educational decision. From this final act of judgment a recommendation can be composed.

Figure 11 represents the processes of judging the merit of an educational program, and it can be readily seen that data from all six cells of the descriptive matrix must come into play in the decision making.

Stake's Model has been described and analyzed. An examination into the applications of the model will allow for further insight into the operational feasibility of the model. Stake (1971, p.48) points out one of the major needs of educational evaluation that is pinpointed with the use of his model, but nevertheless it is very difficult to collect valid data for descriptive purposes. He makes this point by stating that "there is need for ways of expressing what people want

schools to be doing," and in relationship to the intents of a program; "we do have priorities (but) what we fail to have are ways of representing them."

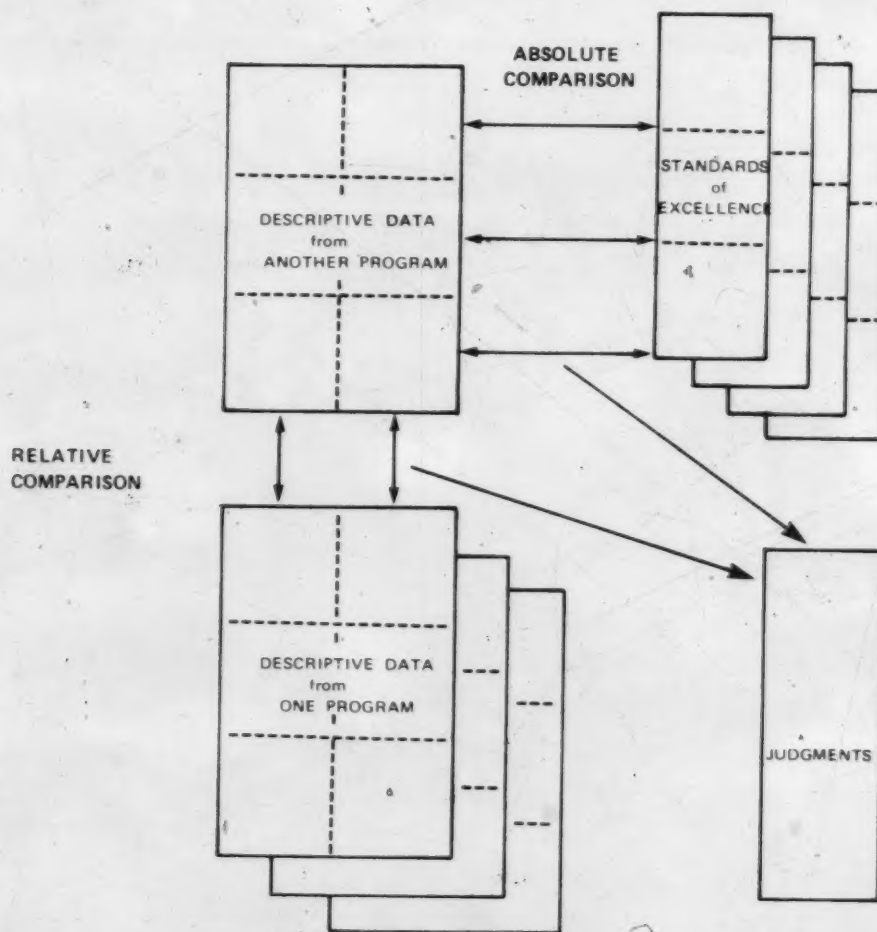


Figure 11. A Representation of Process of Judging the Merit of an Educational Program

Doris Chertow (1970), in what she called A Practical and Feasible Adult Education Improvement Method, points out that the most successful data-collecting instrument she used in conjunction with Stake's Model was daily student recorder notes. The next most important instrument was the instructor's summative questionnaire mailed to students. Although she reports that this exercise illustrates how the Stake Countenance Model can be operationalized in a course for adults, she only reports activities relative to the descriptive matrix. Apparently the activities of the judgment matrix were ignored.

Cox (1971) reports the use of the Stake Model in a "case example" format. He too has ignored the use of the judgment matrix. However, he does provide a good sampling of activities and procedures related to the descriptive matrix; both for data collection and data analysis. A major distinction made by Cox is that there is inherently in any evaluation tasks that which he calls "hard-count data and soft data (perceptual data)". He outlines similar steps to handle both kinds of data. These steps include: 1) interviews with curriculum planners (teachers in his case) to determine the general goals of the program, 2) summarization of all goals to come up with a list of "preferred" objectives, 3) observe and audio-tape-record class sessions, and 4) record results for both soft data and hard-count

data. The objectives described in the intended outcomes were Process objectives including interaction, cognition, subject matter, affective, and task; and, product objectives including character, cognitive, and affective domains. Cox compared, by percentage, the intentions versus the observations to get a measure of dissonance (amount of in-congruence). This comparative profile of intentions and observations is reported in Figure 12.

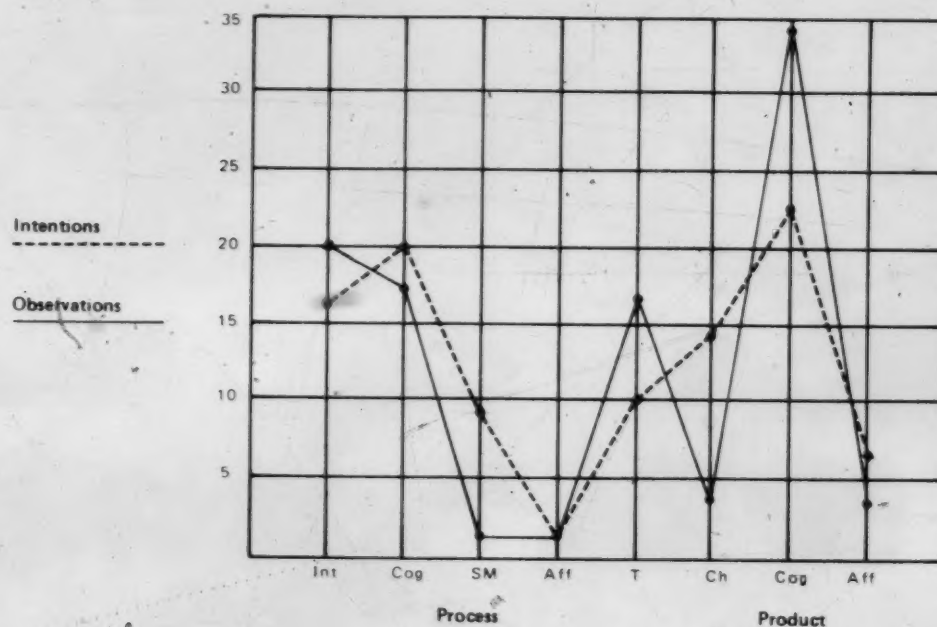


Figure 12. Comparative Profile Showing Dissonance

Cox concludes that the production and comparison of such data are

the bare starting points of an evaluation process; and that judgments must now be made. He does not, however, in this study, go on to carry out the processes of making judgments.

Stake's Model has been reviewed and analyzed. It has become apparent that the model holds great potential for evaluating in-service modular curriculum for teachers of adults. The problem, however, is to determine if operationally the model will suffice. The literature reviewed has not answered the question for, without exception, no explicit activity has been documented which utilizes Stake's Model to fruition; all authors have shied away from the processing of the judgment matrix.

The following section on "meta-evaluation" will review the state of research models in doing these tasks. A strategy for conducting meta-evaluation will be discussed with the intent of applying it to the meta-evaluation of Stake's model.

Meta-Evaluation

Conceptualization of the process of meta-evaluation must be dealt with when attempting to define meta-evaluation. Stufflebeam (1974, p.68) discusses this definition in some detail.

More specifically (meta-evaluation) is defined in this paper as a procedure for describing an evaluation activity and judging it against a set of ideas concerning what constitutes good evaluation.

This, of course, means that meta-evaluation is higher-order evaluation, and that it includes evaluations that are secondary, tertiary, etc. This presents a practical dilemma, since meta-evaluation involves infinite regression, and since it is not practical to act on the infinite possibilities of evaluating evaluations of evaluations.... It is emphasized that infinite regression is a fundamental part of the conceptualization of meta-evaluation.

For this study meta-evaluation will be concerned with only second-order evaluations or, in other words, evaluation that is once removed from the primary evaluation.

Stufflebeam goes on to outline five possible designs for meta-evaluation. These five designs are presented in Figure 13.

Scriven (1972) considers the important aspect of meta-evaluation to be that it should ask, "What does the consumer most want to know?" (p.85). He also points out that the simplest taxonomies or the like be employed if possible.

Wentling and Klit (1973), when applying meta-evaluation processes to a large scale evaluation system, concluded that the most important outcome (pay-off) of a meta-evaluation activity is the involvement of people (educators, researchers, learners, community figures, etc.) which resulted in a great increase in concern, understanding, and involvement.

Purposes of the Meta - Evaluation	Steps in the Meta - Evaluation Process	Objects of the Meta - Evaluation			
		Evaluation Goals	Evaluation Designs	Evaluation Processes	Evaluation Results
Pro-active Meta - Evaluation to serve Decision Making in evaluation work	Delineating the information requirements	Design 1 for Pro-active Assessment of Evaluation Goals	Design 2 for Pro-active Assessment of Evaluation Design	Design 3 for Pro-active Assessment of the Implementation of a Chosen Design	Design 4 for Pro-active Assessments that Enhance the Quality and use of Evaluation Results
	Obtaining the needed information				
	Applying the obtained information				
Retroactive Meta - Evaluation to serve Accountability in evaluation work	Delineating the information requirements	Design 5 for an Overall Assessment of the Merit of the Total Evaluation Effort			
	Obtaining the needed information				
	Applying the obtained information				

Figure 13. Five Designs for Meta-Evaluation

Guba and Stufflebeam (1970) present an extensive overview of the status of educational evaluation and report that there are six major theoretical problems in carrying out such evaluation. These six problems are: 1) inadequate definitions of educational problems, 2) lack of concern for the educational setting, 3) lack of understanding of generalizable information requirements which educational evaluation studies must meet, 4) lack of valid structures to accommodate the above generalizability problem, 5) lack of concepts (models) needed to operate evaluation systems, and 6) a lack of criteria for judging the worth of evaluation strategies (lack of criteria for meta-

evaluation).

They discuss each of these six problems and present some form of solution to most. In general terms this review literature (Chapter II) has dealt with all the problems with the exception of problem six, selection of appropriate criteria for meta-evaluation.

Guba and Stufflebeam present an excellent list of criteria for meta-evaluation. These criteria are brought about from examining the information which the evaluation produces, and are classified under two main kinds: 1) scientific criteria and 2) special criteria. A list of these criteria with definitions for each is reported in their study (pp.33-34), and is presented in total because of the importance of these criteria to this study.

The scientific criteria are these:
Internal validity The information provided by the evaluation must display a reasonable correspondence to the phenomena which it purports to describe or interpret. It must have fidelity, or, in the layman's sense, it must be true.
External validity The information must be generalizable to similar situations beyond the one in which it was collected. Particularistic data have little utility. If, for example, data relating to the effectiveness of an innovation could not be interpreted as also being valid in classrooms other than the ones in which they were collected, little would be gained in deciding whether to adopt or not.
Reliability Here the concern is with the replicability of the data. If a repetition of the evaluation did not produce essentially similar findings, we should be concerned that the findings were simply random and therefore meaningless.
Objectivity Here concern is with the publicness of the data. If data are private in the sense that only particular persons

would so interpret them, i.e., that not all competent judges would agree on them, their true meaning is subject to question.

In addition to these four general criteria that could be invoked in relation to any information, certain special criteria of practical utility must be met by evaluative information. These are: Relevance The information must relate to the decisions to be made. Significance The information must be weighted for its meaning in relation to the decision. Not all relevant information is equally weighty. The culling and highlighting required, is a professional task that justifies the inclusion of a reportorial expert on the evaluation team. Scope The information must relate to all aspects involved in the decision. If there are six alternatives to be considered, information that applies to only four lacks scope. Credibility The information must be trusted by the decision-maker. Timeliness The information must come in time to be useful to the decision-maker. The evaluator must guard against the scientific value that argues against publishing findings until every last element is in. Late information is worthless information. It is better in the evaluative situation to have reasonably good information on time than perfect information too late. Pervasiveness The information must get to all of the audiences (i.e., to all of the decision-makers) who need it. Efficiency It is possible for an evaluation to mushroom out of all proportions to its value. The imprudent evaluator may produce a mountain of information whose collection imposes an intolerable financial drain. Proper application of the criteria of relevance, significance, and scope should remedy the grossest inefficiencies. But even when the information proposed to be collected meets all of these criteria, there are probably still alternative ways for collecting it that differ in terms of the time, costs, personnel, etc., that are required. The criterion of efficiency will guide the evaluator to the appropriate alternative.

An evaluator who can say, after careful examination, that his evaluation

design will produce information that conforms to all of these criteria can be assured that he is doing his job well.

The literature relative to meta-evaluation was found to be very limited. However, that which was reviewed has yielded good guidelines as to the task and procedures of this emerging science. The only reported criteria were considered to be useful and will influence the methodology of this study.

Summary

This chapter has reviewed the literature relevant to: defining curriculum evaluation, presenting and discussing evaluation theories, presenting and discussing evaluation models with an emphasis being placed on the model proposed by Stake, and discussing the processes and criteria of meta-evaluation. This review has presented relevant information for all of these topics and forms the foundation for the methodology of this study.

CHAPTER III

METHODOLOGY

This chapter describes the methodology of the study. The essential procedures utilized in the methodology provide the skeleton upon which this chapter is developed. This skeleton is derived from the sequence of requirements outlined in the purpose of the study. This sequence is to:

- 1) develop a sample of modules of in-service curricula,
- 2) prepare an operational evaluation model,
- 3) deliver modules of in-service instruction,
- 4) use the evaluation model to evaluate the performance of the in-service curricula, and
- 5) report on the results of the meta-evaluation (effectiveness of the operational evaluation model for evaluation of modules of in-service curricula).

The above sequence of requirements then will constitute the major headings of Chapter III. Detailed procedures for each requirement are generally presented in a chronological order.

The procedures and techniques reported here were tested in a pilot study conducted at Algonquin College in Ottawa during

May 1974. Results from this pilot study were utilized to help perfect the methodologies of this study, with the emphasis being on the assistance in the tasks of: preparation of the evaluation model, delivering the modules of in-service instruction, and using the evaluation model to evaluate the performance of the in-service curricula. The pilot study is reported in Chapter IV.

Development of Sample Modules

The development of modules of in-service curriculum for this study involved two major tasks. Task number one was to select the appropriate modules from the total curriculum which would constitute the sample; and task number two was to prepare the content, identify the methodology, and prepare the instructional material for these sample modules.

The Selection of Modules for the Sample was based upon a study by Manuel (1973) conducted at N.A.I.T. and the University of Alberta. All instructional divisions at N.A.I.T. were represented by a sample of forty instructors. Twenty-eight potential instructors who were enrolled at the University of

Alberta also participated in the study. They had been given instruction dealing with several curriculum areas and ten of these areas were common to both groups.

These ten content areas were structured to form a scaling instrument using Thurston's Matched Pairs (Torgerson 1958). The instrument was administered to the sample of instructors and potential instructors, requesting them to indicate the "most relevant" module for their teaching". Scale values resulting from this study indicated the relative perceived importance of the ten modules. The results of this scaling study are presented in Table 2 and Table 3.

The scale values derived from the data are represented on an interval scale with a mean of zero and a standard deviation of one. No attempt was made to "fix" the scale and represent the values on a ratio scale. The values can be compared relative with each other, but not to an absolute criterion; that is to say that even though, for instance, number 9 (Psychomotor Learning) was most negative for the total group, it cannot be interpreted that it was considered irrelevant but only that it was considered less relevant than others to which it was compared.

The resulting scale values for the N.A.I.T. group were different than those of the University group (correlation of 0.80), and obviously different than those for the combined groups. It was decided that because there was a difference, the scale values for the N.A.I.T. group would be utilized to

Table 2

Scale Values for Combined Group

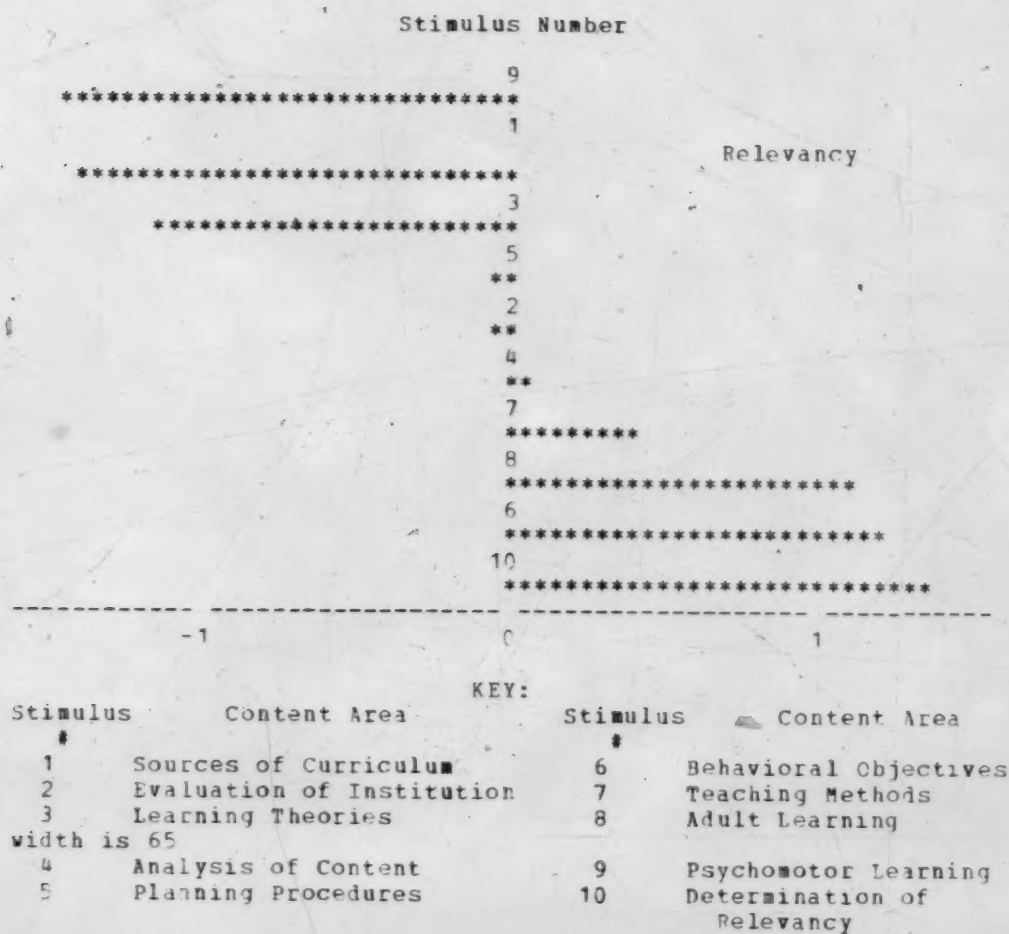


Table 3

Scale Values for Separate Groups

N.A.I.T. Group		U. of A Group	
Stimulus # (lowest to highest)	Scale Values	Stimulus # (lowest to highest)	Scale Values
1	-1.384	9	-1.796
3	-1.215	1	-1.172
*9	-1.123	3	-1.067
5	-0.396	4	-0.483
2	-0.214	2	0.339
4	0.283	7	0.463
7	0.428	5	0.518
*8	0.882	10	0.597
6	0.948	8	1.368
10	1.791	6	1.461

*Those two stimulus numbers chosen as samples for the study.

determine the sample of in-service content to be developed. This decision was made because the N.A.I.T. group were basing their judgments on actual teaching experience, whereas the U. of A. students (potential instructors) were basing their judgments on perceived future teaching. The criterion used to select areas of content (modules) was generally this: They were to be relatively far apart on the scale, but at the same time not at the extreme ends; and to coincide with the relative content expertise of the researcher (the person to be employed as the instructor in the delivery of the modules). With these general criteria the two modules selected were Psychomotor Learning (#9) and Adult Learning (#8). These two modules best fit all the above criteria.

The Preparation of Modules involved many tasks, including: identifying the general format and time constraints, review of relevant literature, development of instructional objectives, identification of learning activities, the development of instructional plans and aids, and the preparation of the learning environment (procurement of space and instructional support hardware).

It was important to conduct this study in a realistic environment. With the identification of N.A.I.T. as the experimental institution, it became necessary to identify the conditions and constraints under which reality could be maintained. The constraints as to format and time in this environment were the same for both modules, and these major constraints were: 1) each module was expected to "stand alone", that is to have no pre-requisite or co-requisite specification; 2) clients in the program would be selected by the process of advertisement within the institution and acceptance on a first come first serve basis to a maximum of twenty-five clients; 3) clients would be able to participate in the learning environment only within the time available during a regular work week, but outside of normal working hours; 4) and the total time available for learning within any one module would be limited to a total of twelve in-class hours.

Each of the two modules was developed employing the

same procedures. The team approach to module development was considered but was not used in favour of using the researcher's content expertise as the major source of structure and content because of time constraints. The documents of the finished modules are outlined in Appendix A (Adult Learning Module) and Appendix B (Psychomotor Learning Module). These documents each contain the following material: instructional objectives; instructional software (overhead transparency masters, handouts, etc.); pre and post tests (developed for the evaluation process discussed later); and a bibliography of the literature reviewed in the identification of the structure and content.

The major task of reviewing the literature relevant to each of the two selected modules was undertaken with the intent of identifying relevant structure and content for each module. From this extensive review of literature the structure was outlined and matched with the stated goals of in-service education at N.A.I.T. to assist in the task of preparing the instructional objectives.

Instructional objectives were prepared in a format similar to that put forth by Gronlund (1970). The majority of objectives were specific at the application level within the cognitive domain.

Following the preparation of complete instructional objectives was the preparation of lesson plans and instructional software. The large numbers of clients and the relatively short

period of learning time available influenced the selection of learning environments to be generally appropriate to large class presentations. The planned learning activities are described in detail in the section on the preparation of the evaluation model covering the intended transactions. Instructional software to assist in the presentation of the modules was prepared at this time.

Preparation of the Evaluation Model

The review of literature in Chapter II described the structure of the evaluation model (Stake's Model) employed in this study. In addition to this structure an operational framework had to be established to interface the evaluation model with the realities of the experimental environment. The tasks involved in this function are described with specific reference being made to the kinds of data to be collected and their relationship to the evaluation model. Specifically, this section identifies and describes how each instrument was developed and how it was employed in data collection. These descriptions reflect the refinement of activities first tested in the pilot study.

The Rationale. The procedure for gathering data for the "rationale" of the evaluation model was to conduct a directed

interview with the person responsible for the development of in-service programs at the institution where the sample of subjects was identified. The interview was conducted with Mr. Les Morgan, Director of Research and Staff Development at N.A.I.T. The questions asked at this directed interview were:

#1. In general terms what are the major reasons why an in-service program is being established at N.A.I.T.?

#2. What are the major goals of the program?

#3. Who will the program serve?

#4. What general format do you envision the program should take?

#5. What other comments regarding the rationale behind the program do you wish to make?

Cell # 1 (Intended Antecedents). Data for the intended antecedent cell of Stake's model is categorized into three major classes: 1) a description of the intended clientele, 2) a description of the intended resource person or personnel (instructors), and 3) a description of the physical resources intended to be utilized. The instructor collected this data by summarizing the advanced information under three headings.

Cell # 2 (Observed Antecedents). Data for the observed

antecedents replicates the classifications described for intended antecedents. To collect data relevant to the description of clientele a "general biographical information" questionnaire was developed. Each client upon registration for the in-service module completed this questionnaire. A copy of this questionnaire can be viewed in Appendix D. Data collection for the purpose of describing the resource person required no special instruments nor any special techniques other than a summary of a curriculum vita. A simple check list was utilized to record data relative to the observed physical resources employed.

Cell # 3 (Intended Transactions). The intended transactions, as with the intended antecedents, required no special preparation of instrumentation. A detailed description of the transactions as envisioned within the logical contingencies between antecedents, transactions and outcomes was recorded prior to the delivery of the program.

Cell # 4 (Observed Transactions). Results from the pilot study demonstrated that adequate recording of the transactions would be made by keeping up-to-date continuous records of the class activities (recording activities on a check list at short intervals), and by having subjects report "at home" activities.

Cell # 5 (Intended Outcomes). Development of techniques to identify and record the intended outcomes amounted to the utilization of performance objectives and sequencing techniques as outlined by Gronlund (1970). The specification of objectives, then, amounted to the methodology employed for this task.

Cell # 6 (Observed Outcomes). The procurement and/or development of instruments for the task of making observations on the outcomes amounted to a major task. Instruments had to be developed to measure the extent of attainment of the only a Likert scale instrument was used for the Psychomotor Learning Module because the results from the pilot study showed no significant difference from the results using a Paired Comparison instrument. The Likert scale instrument is easier to administer and requires less time on the part of the subjects. 'intended' outcomes as described by the performance objectives for each module. Two general classes of instruments were developed: 1) for the measurement of cognitive objectives, and 2) for the measurement of affective objectives.

Measurement of the cognitive objectives of the Adult Learning module was accomplished with the preparation of a forty item multiple choice pre-test and a parallel form forty item multiple choice post-test. This was accomplished by preparing two parallel items at a time and randomly assigning one item to the pre-test and assigning the other to the post-test. All items were

read by several content experts for content validity, and modifications were made before assignment to either the pre or post tests. It was judged by these experts that the items adequately represented the content as described in the performance objectives. The measurement of the cognitive objectives of the Psychomotor Learning module was carried out with the preparation of a forty-five item multiple choice pre-test and a parallel form forty-five item post-test developed by similar techniques to that of the pre and post tests described above for the Adult Learning module.

Measurement of attainment of the affective domain objectives of each module was accomplished by: preparing a Paired Comparison instrument and a Likert Scale instrument for the Adult Learning module; and preparing a Likert Scale instrument for the Psychomotor Learning module. Only a Likert scale instrument was used for the Psychomotor Learning Module because the results from the pilot study showed no significant difference from the results using a Paired Comparison instrument. The Likert scale instrument is easier to administer and requires less time on the part of the subjects. Statements for each of these scaling instruments were selected from recent literature pertaining to the respective modules. Affective domain outcomes would be measurable by observing a change between pre and post administration of these instruments.

This section has described the tasks involved in the

preparation of the operational evaluation model with specific reference as to what instruments were utilized, and how they were utilized. Examples of all instruments used in the study which have been described in this section can be viewed in Appendix D.

Delivering Modules of In-Service Instruction at N.A.I.T.

This section will describe the procedures carried out to deliver the two modules of in-service instruction to samples of instructors from N.A.I.T. The sample of instructors was selected by advertisement throughout the institution and because credit towards the pay scale would be granted to those who participated, the volunteers were considered representative of the population that would normally be involved in in-service programs. The sample for the two modules was the same and totalled forty-three instructors. Two factors made it necessary to split the sample of forty-three into two groups, one group of nineteen and one of twenty-four. These factors were: 1) no two evenings could be identified when all forty-three instructors could participate, and 2) forty-three instructors in one class exceeded the maximum number (twenty-five) specified in the intended antecedents. The group of nineteen instructors met on Monday and Wednesday evenings in June, 1974 for two weeks (four evenings for three hours each evening or a total of twelve hours). This group then met on Monday and Wednesday evenings for a subsequent two weeks and a similar total participation time for

the Psychomotor Learning module. The group of twenty-four instructors met on Tuesday and Thursday evenings (three hours each time) for four consecutive weeks for instruction in the Adult Learning module and the Psychomotor Learning module for a total of twelve hours respectively for each module. Specific details as to the exact involvement of the groups in the instruction appear in Chapter V (Results) because these data constitute a significant element in Stake's Model of influential decision makers at N.A.I.T. The results on observed antecedents describe the samples in detail; the results on observed transactions describe the specific interactions in classes in detail; and the observed outcomes describe the results of the performance of subjects in presenting a summary of all the data of the descriptive matrix and learning the objectives for each module. It was considered sufficient to report this information in the results, as it is an inherent component of the outcomes of this study and forms an integral part of Stake's model. Furthermore, the preceding section dealing with the preparation of the operational evaluation model has described the procedures employed in the gathering of the other related data at the time of delivering the modules of in-service curriculum.

Using the Evaluation Model

The use of the evaluation model to evaluate the performance of the in-service Individual judgments were then made

and reported on a set of forms provided for the purpose. Appendix E shows all the documents presented to the decision making group.

curricula involved collection of data for the "standards" and "judgment" columns of the evaluation model. This is reported in the paragraphs that follow, grouped into cells representative of the evaluation model. The outcomes resulting from the administration of this model are reported in Chapter V.

Cells 7, 9 and 11 (Standards for Antecedents, Transactions and Outcomes). The procedures for gathering data relative to the standards for antecedents, transactions and outcomes generally involved: the selection of a representative group of the decision makers from N.A.I.T., orienting this group to the tasks of 'standards' selection as dictated by the model, presenting the group with data from the pilot study as requested, and gaining a consensus opinion as to the standards to establish.

The group selected was the five directors of N.A.I.T. who have no direct responsibility for the planning of in-service programs, but who are keenly concerned with the programs because they represent the users of in-service programs. Also it was considered that this identifiable group is representative of influential decision makers at N.A.I.T. This small group was then brought together for the orientation. The orientation to the tasks involved presenting a brief overview of Stake's Model,

briefly describing the activities of the pilot study and the experimental study, presenting a summary of all the data of the descriptive matrix and presenting suggestions on how to go about establishing standards. These suggestions included three main approaches: 1) identify the standards on the basis of absolute criteria from the consensus of this expert group; 2) recognize the results of the pilot study at Algonquin College as the criteria; or 3) recognize the previously described criteria as laid out in the "intended" column for the experimental study as the criteria. Once a group choice was made by the group these standards were then employed as the basis to make "judgments" about each of the two module offerings. Individual judgments were then made and reported on a set of forms provided for the purpose. Appendix E shows all the documents presented to the decision making group.

Cells 8, 10 and 12 (Judgments). Judgments made by this group of experts were on many dimensions. Firstly, judgments were made as to the logical contingency of the experimental programs; secondly, judgments were made as to the congruence and empirical contingency of the experimental programs; and lastly, judgments were made as to the extent of success of each program (module) on achieving the tasks laid out for each of the antecedents, transactions, and outcomes. The adopted set of standards were employed to assist in this latter set of tasks.

Results of the Meta-Evaluation

To conduct a meta-evaluation it was decided to meld the thinking relative to Stake's model with that of the criteria suggested by Guba and Stufflebeam (1970). Procedures to accomplish this included the following: 1) develop an instrument utilizing the criteria outlined by Guba and Stufflebeam, 2) procure the cooperation of the same group of experts employed for making judgments re: the in-service programs, 3) administer the instrument to this group of experts, and 4) summarize and discuss the results of this instrument.

The meta-evaluation instrument employed is a simple Likert type scaling instrument developed from the list of criteria found in the review of literature. This instrument was simplistic by design in light of suggestions made in the literature regarding the importance of keeping meta-evaluation (second order evaluation) tasks simple and designed to meet the needs of the consumer (i.e. decision makers at N.A.I.T.). The instrument can be viewed in Appendix F.

The instrument was administered to the same group of experts because they represent the appropriate consumers of the meta-evaluation, and they were previously made fully aware of the first order evaluation tasks and results. They responded to this instrument a short period after all the first-order evaluation tasks were completed.

Results from the meta-evaluation activities were summarized and discussed by the researcher as the final task of the meta-evaluation. This summary and subsequent discussion appear in the Results of the Study (Chapter V).

Summary

This chapter has described the methodology of the study. This methodology was conducted in a sequence representing the following tasks: 1) developing a sample of modules of in-service curricula, 2) preparing an operational evaluation model, 3) delivering the modules of in-service instruction, 4) using the evaluation model to evaluate the performance of the in-service curricula (a first-order evaluation), and reporting on the results of the meta-evaluation (a second-order evaluation).

The procedures for each of these tasks were fully described and examples of each instrument employed were referenced to the appropriate appendix where each could be examined. Chapter V describes the results of each of these tasks in an order corresponding to the order in which they were presented in this chapter.

CHAPTER IV

THE PILOT STUDY

The pilot study was conducted at Algonquin College in Ottawa during May, 1974. Algonquin College was selected for two reasons: 1) it has a similar array of programs and courses, and subsequently content expertise in instructional staff, to that of N.A.I.T.; and 2) it is geographically removed from N.A.I.T. to the extent so as to have prevented communication between subjects of the pilot study and subjects of the experimental group at N.A.I.T. A description of the methods employed and a summary of the data collected are presented here. It must be noted that this pilot study was designed to test the procedures up to and including the delivery of the sample modules. It reports on the collection of data for the "descriptive matrix" of Stake's Model, but does not report on the results of the "use of the evaluation model" nor does it report on the activities of "meta-evaluation".

Samples (Antecedents)

Selection of subjects for participation in the study was carried out by the Department of Staff Development at Algonquin College. They advertised across the five campuses of

Algonquin College to seek voluntary instructor enrollment to each of the two modules (Adult Learning and Psychomotor Learning).

Descriptions of the subjects who enrolled in the two programs was determined from summarizing the data collected by a biographical questionnaire completed by each subject at the beginning of the program. These data correspond to the data collected for cell #3 of Stake's Model (Observed Antecedents). Tables 4, 5 and 6 summarize the biographical data for subjects in the Adult Learning module; and Tables 7, 8 and 9 summarize the biographical data for subjects in the Psychomotor Learning module.

Table 4

Summary of Age of Sixteen Subjects in Adult Learning Module

Range (Years)	# of Subjects
20-24	0
25-29	27
30-34	37
35-39	18
40-44	9
45-49	9
over 50	9
Note: Mean Age = 34.5 years	

Table 5

Summary of Educational Experience Beyond High School of Sixteen
Subjects in Adult Learning Module

Range (Years)	% of Subjects
Less than 1	0
1	0
2	0
3	0
4	55
5	45

Table 6

Summary of Teaching and Other Work Experience of Sixteen Subjects
of Adult Learning Module

Range (Years)	Teaching Experience	
	Adult Teaching (%)	Other Teaching (%)
Less than 1	30	60
1	6	0
2	8	5
3 - 5	41	16
5 or more	15	19

Other Work Experience	
Range (Years)	% of Subjects
1 - 2	10
3 - 5	12
6 - 10	30
10 or more	48

Note: Mean Years of Other Work Experience = 15.3

Table 7

Summary of Age of Seven Subjects in Psychomotor Learning Module

Range (Years)	% of Subjects
20 - 24	0
25 - 29	29
30 - 34	14
35 - 39	29
40 - 44	0
45 - 49	14
over 50	0

Note: Mean age = 32.7 years

Table 8

Summary of Educational Experience Beyond High School of Seven Subjects in Psychomotor Learning Module

Range (Years)	% of Subjects
Less than 1	14
1	0
2	0
3	28
4	0
5	58

Table 9

Summary of Teaching and Other Work Experience of Seven Subjects
of Psychomotor Learning Module

Teaching Experience		
Range (Years)	Adult Teaching (%)	Other Teaching (%)
Less than 1	42	72
1	14	0
2	0	0
3 - 5	30	14
5 or more	14	14
Other Work Experience		
Range (Years)	% of Subjects	
1 - 2	14	
3 - 5	14	
6 - 10	14	
10 or more	58	

Note: Mean Years of Other Work Experience = 10.6

Transactions

The intended transactions for each of the two modules was determined to be twelve hours (720 minutes) contact time broken into: a) sixty minutes to be used for data collection, b) sixty minutes to be used for feedback, c) approximately 240 minutes to be spent in interaction in seminar activities, and d) the remainder (approximately 360 minutes) to be used for lecture/demonstration activities. In addition to the contact time (in-class time) it was anticipated that sixteen hours of "at home" activities would be utilized by each subject for: a) reading specified material (approximately thirteen hours), b)

reading other material (approximately one hour), and c). studying or reviewing in-class activities (approximately two hours). These intended activities were outlined to best meet the objectives of each module (see Appendix A and Appendix B) within the limitations of time and environment established by in-service program routines at Algonquin College and anticipated constraints outlined by N.A.I.T.

The observed transactions for each of the two modules were recorded by a combination of: a) audio tapes of all in-class activities, b) instructor records maintained on a continuous basis, and c) reports of subjects regarding "at home" activities. Tables 10 and 11 summarize the data on these observed transactions for the Adult Learning module, and Tables 12 and 13 summarize the data for the Psychomotor Learning module.

Table 10

Summary of Observations of In-Class Transactions for Adult
Learning Module

Subject Activities	Minutes	% of Total
Listening & Observing	350	48.6
Group Discussion	70	9.7
Practicum Activity	30	4.2
Informal Interaction	120	16.7
Data Collection	75	10.4
Feedback	75	10.4
Total	720	100

Table 11

Summary of Observed "At Home" Transactions for Adult Learning

Module

Subject Activities	Range (Minutes)	Mean (Minutes)
Reading	0 - 430	255
Other	0 - 60	35
Total	0 - 440	290

Table 12

Summary of Observations of In-Class Transactions for Psychomotor

Learning Module

Subject Activities	Minutes	% of Total
Listening & Observing	300	41.7
Group Discussion	120	16.7
Practicum Activity	45	6.2
Informal Interaction	120	16.7
Data Collection	60	8.3
Feedback	75	10.4
Total	720	100

Table 13

Summary of Observed "At Home" Transactions for Psychomotor
Learning Module

Subject Activities	Range (Minutes)	Mean (Minutes)
Reading	0 - 265	140
Other	0 - 30	10
Total	0 - 270	150

Results (Outcomes)

The intended outcomes for each of the two modules were stated to be a measure of growth (difference between pre-test and post-test scores on items representative of the stated objectives) on cognitive objectives; and a measure of growth (change towards norm) on specific statements re: a view of "how adult students learn," and "how skills are learned" on affective objectives. The instruments used to measure outcomes on the Cognitive domain objectives were: 1) for the adult learning module - a forty item multiple choice pre test and a parallel form forty item multiple choice post test, and 2) for the psychomotor learning module - a forty-five item multiple choice pre test and a parallel form forty-five item multiple choice post test. These documents are found in Appendix D. Instruments developed to measure the growth on the Affective domain objectives were a Paired-Comparison instrument and a Likert scale

instrument for the adult learning module, and a likert scale instrument for the psychomotor learning module.

The observed outcomes are reported here - first for the cognitive domain objectives, and second for the affective objectives. A summary of the growth on the cognitive objectives is presented by: 1) reporting scores on the pre test, 2) reporting scores on the post test, and 3) reporting results of a test for significant difference between pre and post tests (t test) for each module. Table 14 reports the results for the adult learning module and Table 15 for the psychomotor learning module.

Table 14

Results on Cognitive Objectives for Adult Learning Module
(Correlated t Test)

Means:	Pre Test	Post Test
	26.875	29.187
Probabilities of t for Differences Between Variances		
	1	2
1	1.000	0.831
2	0.831	1.000
Probabilities of t for Differences Between Means		
	1	2
1	1.000	0.049
2	0.049	1.000

Table 15

Results on Cognitive Objectives for Psychomotor Learning Module
(Correlated t Test)

Means:	Pre Test	Post Test
	17.86	24.41
Probabilities of t for Differences Between Variances		
	1	2
1	1.000	0.138
2	0.138	1.000
Probabilities of t for Differences Between Means		
	1	2
1	1.000	0.017
2	0.017	1.000

A summary of the growth on the affective domain objectives amounts to the reporting of results of: 1) a Likert scale and Paired Comparison instrument dealing with seven statements regarding adult learning, and 2) a Likert scale dealing with six statements regarding psychomotor learning. The seven questionnaire statements dealing with adult learning are:

1. The adult student is likely to be rigid in his attitudes and beliefs.
2. The adult student is generally impatient in the pursuit of learning objectives.
3. The adult student tends to have difficulty in

remembering isolated facts.

4. The adult student usually requires a longer time to perform learning tasks.

5. The adult student tends to be afraid of failure at the beginning of a new learning task.

6. Adults are sometimes fatigued when they attend classes.

7. Adults are easily distracted by inappropriate (noisy, etc.) learning environments.

Table 16 reports pre and post test results for the values assigned to the Likert scale (five point scale) on seven statements regarding adult learning.

Table 16

Pre and Post Ratings for Adult Learning Module From Likert Scale
Instrument

Statements:	#1	#2	#3	#4	#5	#6	#7
Pre Test	3.313	2.938	3.625	3.250	3.813	4.000	3.188
Post Test	3.750	3.583	4.167	3.750	4.083	4.250	3.933

Note: Correlation between pre and post ratings = 0.946

Table 17 reports the pre and post test results for the ranking assigned the seven statements by the Paired Comparison instrument.

The six questionnaire statements dealing with psychomotor learning are:

1. People who have trouble in "academic" programs usually do very well in "vocational" programs.
2. Motor skills can be learned very quickly.
3. Compared to "cognitive" learning environments, the learning environment for the development of motor skills is better suited to individual learning.
4. Trial and error techniques should be an integral part of the learning activities in skill development programs.
5. Motor skills are harder to learn than cognitive skills.
6. Lack of motivation is not a problem generally associated with the learning of motor skills.

Table 17

Pre and Post Ratings for Adult Learning Module From Paired
Comparison Instrument

Pre Test Rankings	
Stimulus Number	
	4
(-1.118) *****	2
(-1.097) *****	7
(-0.967) *****	1
	***** (0.251)
	6
	***** (0.476)
	1
	***** (0.832)
	5
	***** (1.622)

-1	0 +1
Post Test Rankings	
Stimulus Number	
	2
(-1.651) *****	1
(- 0.744) *****	7
(-0.543) *****	4
	*** (0.105)
	6
	***** (0.256)
	3
	***** (1.166)
	5
	***** (1.411)

-1	0 +1

Note: Correlation Between Pre and Post Test Ratings = 0.774

Table 18 reports the pre and post test results for the values assigned to the Likert scale (five point scale) on the above six statements.

Table 18

Pre and Post Ratings for Psychomotor Learning Module From Likert Scale Instrument

Statements:	#1	#2	#3	#4	#5	#6
Pre Test	2.143	2.000	3.429	3.143	2.714	2.714
Post Test	2.857	2.571	4.143	4.000	3.142	2.857
Note: Correlation between pre and post test ratings = 0.925						

Summary

The general results of the pilot study conducted at Algonquin College have been reported here. Conclusions drawn from this study are many. The foremost conclusion is that data necessary for the operation of Stake's model of evaluation can be gathered in the "real" environment. Several instruments and procedures were tested which, in general, proved to be operational and effective. The results of this pilot study were utilized for: assisting in the preparation of the evaluation

model; delivering the modules of in-service instruction ; and using the evaluation model to evaluate the performance of the in-service curricula (specifically to assist in establishing a standard required for the "judgment matrix" of Stake's Model). The methodology (described in Chapter III) for these tasks was perfected by utilizing the results of the pilot study.

CHAPTER V

THE RESULTS

The results reported in this chapter will be presented according to five headings, following the general format established in earlier chapters. These headings are: 1) results of sample curriculum preparation, 2) results of preparation for delivery of instruction, 3) report on the delivery of curriculum modules, 4) results of the evaluation of curriculum, and 5) results of meta-evaluation.

In this study a sample of two modules of curriculum were developed and each of two groups of subjects was taught the content included in the two modules of curriculum. The two sample modules of curriculum have been labelled "Adult Learning" and "Psychomotor Learning"; while the two groups of subjects have been identified as the "Monday-Wednesday group" (M-W group) and the "Tuesday-Thursday group" (T-R group).

Curriculum Development of Sample Modules

The results for this portion of the study have been discussed previously in Chapter III. However, in review, there were two major results coming out of the activities of preparing the sample modules of curriculum. These results were to 1) select

topics and 2) specify, select, develop and document content for two modules of curriculum to serve as the basis for the experimental studies. The two sample modules selected were a) Adult Learning and b) Psychomotor Learning. The documents for these completed modules are included in Appendix A and Appendix B respectively.

Preparation for Delivery of Instruction

The preparation for the delivery of instruction yields data categorized within the structures identified by the Stake Model. Specifically, the results are reported for the categories of "Rationale" and for each of the three cells of the "intended column".

The Rationale. Results of data collection and summarization relative to the "Rationale" of the Stake Model is a direct outcome of the directed interview with Mr. Les Morgan, Director of Research and Academic Development at N.A.I.T. The results of this interview are summarized and presented in paragraph form with identification of the kinds of questions asked and also with additional information offered during the interview.

The major reason why an in-service program is being established at N.A.I.T. is that for the most part hiring of instructional staff employs selection criteria which are heavily weighted towards "technical content" expertise. It is subsequently felt that there is a need for each instructor to be able to

perform effectively as a teacher.

The major goals of the total in-service program are to provide skills, knowledge, and an opportunity to develop a competency to perform effectively in the classroom or laboratory. To meet this general goal pedagogical content (i.e. learning psychology, teaching strategies, curriculum development skills, etc.) constitutes the core of the program.

This in-service program will serve all instructional staff. Any instructor who has documented evidence that he or she possesses good pedagogical competencies can participate in the program on a voluntary basis. As can be seen by the format of the program, part is generally compulsory for all instructional staff.

The general format of the program is to have two general categories of in-service offerings. Category A would normally be compulsory and be directed at all new instructional staff. Category B would be voluntary and directed at all instructional staff. Category A will have a decentralized component (handled by the individual teaching departments) and a centralized component (handled by the overall administration of the Institution). The decentralized component includes orientation to the individual teaching departments with an opportunity to identify specific immediate needs prior to instructing, and attempting to meet these specific needs. The centralized component will constitute seven working days of general orientation to policies and procedures of the total Institution and its mandate to clients and industry. This component also includes instruction in safety procedures and first aid procedures.

Category B of the total in-service program at N.A.I.T. has three components. One component provides recognition via special diploma for instructors who have developed, taught, taken or challenged courses or technical content within N.A.I.T. A second component provides recognition and encouragement for completion of courses,

seminars, etc. offered at other institutions or in industry. The third component, more identifiable as a truly "in-service" program, is a comprehensive program of general and specific pedagogical content. (Researcher's note: This component of the total in-service program at N.A.I.T. is the component within which the sample of modules of curriculum were presented and studied.) The content for this component will be offered as credit-hour modules. A module is functionally defined as being independent of any pre-requisite relationship with other units of curricula (other modules).

Ideally the in-service programs at N.A.I.T. should be changing towards competency based formats, remain flexible, and reflect ever apparent changes in need.

Additional results relevant to the preparation for delivery of instruction are reported by focussing attention on data for each of the three cells of the intended column of Stake's Model. These data were generated as planning activity for preparation for instruction, and reflect the goals and procedures identified for the rationale.

Intended Antecedents (Cell #1). The results relevant to cell #1 constitute a detailed description of the intended clientele, intended resource person, and physical resources intended to be employed. Generally the intended categories identified here were expected to be similar for both curriculum modules. That is, the same group of clients, the same resource person, and the same physical facilities were combined for each module.

A description of the intended clientele was identified by the researcher based on input from N.A.I.T., data from the pilot study, and general knowledge about the total instructor population at N.A.I.T. No special pre-assessment was carried out (in the form of pre-registration, etc.) to best simulate real conditions. It was felt that in most instances this would constitute the context in which planning for modular curricula would come about. Table 19 summarizes the data identified for the intended clientele populations.

The resource person (teacher) identified to instruct for both modules was the researcher. Those qualifications of the instructor (researcher) pertinent to the tasks of instruction in the two modules, in the context of adult in-service instructor education are:

Age - 34 years

Education - B.Ed. in Industrial Arts, M.Ed. in Industrial Education, Ph.D. candidate in Educational Psychology

Teaching Experience - two years in Jr.-Sr. High School, eight years in Faculty of Education,

Planning and conducting several in-service programs, workshops, etc. in adult context over past five years

Rapport - Previous good rapport with similar clientele.

Table 19

Description of Characteristics
Of Intended Clientele For Both Modules

Number of Clients per Module = 25

Age Range: 25 - 55 years, X = approx. 35

Education:

Completed High School	75%
Beyond High School	
less than 1 year	30%
between 1 year and a degree	45%
degrees completed	25%
Formal Pedagogical Instruction	
none	70%
some	25%
certified	5%

Experience:

Teaching

	Adult	Other
none	0%	80%
less than 1 year	0%	0%
2 years	30%	0%
3 - 5 years	40%	10%
5 or more years	30%	10%

Other related work experience

1 - 2 years	10%
3 - 4 years	30%
5 - 6 years	15%
7 - 8 years	15%
9 or more years	15%

The physical facilities identified for use with both modules constituted that facility which normally was available for group in-service activities at N.A.I.T. Generally these facilities included:

A standard adult classroom for 25 to 30 people

Good audio-visual support

Good environmental conditions

Intended Transactions (Cell #3). The intended transactions for each of the two modules was determined to be twelve hours (720 minutes) contact time. This total in-class time was intended to be augmented by an average of six hours (360 minutes) of individual "at home" activities. A breakdown of intended times for various transactions within the in-class activities follows:

listening and observing	360 minutes
group discussion	120 minutes
practicum activity	60 minutes
informal interaction	60 minutes
data collection	60 minutes
formal feedback	60 minutes

A breakdown of the at home transactions intended is as follows:

reading specified material	240 minutes
reading unspecified material	60 minutes
review of material for study	60 minutes

Details as to the exact nature of each of these transactions are found in the module documentation in Appendix A and Appendix B.

Intended Outcomes (Cell #5). The results for the intended outcomes are unique for each module. The specific instructional objectives for each module express in detail the intended outcomes, with the group criteria left to be established at the time of making judgments (specifically establishing standards for the outcomes). In addition to the specific content (cognitive) objectives for each module, affective outcomes were

expected. These intended affective outcomes were simply an anticipated change in the ranking of statements regarding beliefs about adult learning (for the Adult Learning module) and beliefs about psychomotor learning (for the Psychomotor Learning module). The intended outcomes, largely expressed as instructional objectives, are linked logically to the antecedent conditions and educational transactions which precede and influence their achievement and are to be assessed with reference to them. This relationship is akin to ensuring logical contingencies between the antecedents, transactions and outcomes as described in the descriptive matrix of Stake's Model.

Report on the Delivery of Curriculum Modules

In keeping within the framework of the descriptive matrix of Stake's Model, the report on the delivery of modules constitutes reporting on the data collected for each of the three cells of the observed column.

Observed Antecedents (Cell #2). The results of observations relative to the antecedents constitutes reporting the data collected for categories parallel to those categories of the intended antecedents. Data on the actual clientele is reported here in a parallel format to that of the intended data reported in Table 19. Tables 20 and 21 summarize these data for the two groups of clients utilized in this study.

Observed data relative to the description of the resource person is naturally identical to the data for the intended description. This is so because at the time of planning (identifying the data for the intended column) the resource person had been selected.

Physical facilities utilized for each module also matched exactly those described in the intended columns.

Observed Transactions (Cell #4). It is necessary to report the observed transaction data for each learning environment. Because there were two different modules of content and each of the two different groups of subjects were involved in each module, the transaction data are reported in four Tables. These are: Table 22, reporting data from the M-W group for the Adult Learning module; Table 23, reporting data from the T-R group for the Adult Learning module; Table 24, reporting data from the M-W group for the Psychomotor Learning module; and Table 25, reporting data from the T-R group for the Psychomotor Learning module.

Table 20

Description of Characteristics of
the M-W Group of Clients

Number of Clients = 19

Age of Clients:	Range	%
	20 years and less	0
	20 - 24 years	0
	25 - 29 years	14
	30 - 34 years	18
	35 - 39 years	18
	40 - 44 years	27
	45 - 49 years	14
	50 years and over	9
	$\bar{x}$ = 38.7 years	

Education:

	%
Completed High School	77
Beyond High School	
Less than one year	14
Between one year & a degree	32
Degrees completed	50
Formal Pedagogical Instruction	
None	79
Some	16
Certified	5

Experience:

Teaching

	Adult %	Other %
None	0	79
Less than one year	0	0
2 years	32	9
3 - 5 years	36	0
5 or more years	32	21

Other Related Work Experience

1 - 2 years	11%
3 - 4 years	26
5 - 6 years	26
7 - 8 years	21
9 or more years	16

Table 21

Description of Characteristics of
The T-R Group of Clients

Number of Clients = 24

Age of Clients:

Range	%
20 years and less	0
20 - 24 years	0
25 - 29 years	0
30 - 34 years	32
35 - 39 years	20
40 - 44 years	8
45 - 49 years	20
50 years and over	20
x = 41.4 years	

Education:

Completed High School	68
Beyond High School	
Less than one year	48
Between one year & degree	28
Degrees completed	24
Formal Pedagogical Instruction	
None	76
Some	12
Certified	12

Experience:

Teaching		
None	Adult %	Other %
Less than one year	0	83
2 years	0	0
3 - 5 years	29	0
5 or more years	44	4
Other Related Work Experience	27	13
1 - 2 years	8%	
3 - 4 years	16	
5 - 6 years	25	
7 - 8 years	29	
9 or more years	22	

Table 22

Observed Transactions of 1-W Group
For Adult Learning Module

In-Class Activities		
Activities	Minutes	% of Total
listening and observing	400	56
group discussion	60	8
practicum activity	40	5
informal interaction	60	8
data collection	85	12
formal feedback	75	10
Total	720	100

At Home Activities		
Activities	Minutes (range)	Minutes (mean)
reading specified material	0-300	105
reading unspecified material	0-60	13
review for studying	0-150	37
Total	0-310	86

Table 23

Observed Transactions of T-R Group
For Adult Learning Module

In-Class Activities		
Activities	Minutes	% of Total
listening and observing	440	61
group discussion	45	7
practicum activity	40	5
informal interaction	60	8
data collection	70	10
formal feedback	65	9
Total	720	100

At Home Activities		
Activities	Minutes	Minutes
reading specified material	15-280	180
reading unspecified material	0-75	46
review for studying	0-130	52
Total	2-305	107

Table 24

Observed Transactions of M-W Group
For Psychomotor Learning Module

In-Class Activities

Activities	Minutes	% of Total
listening and observing	425	59
group discussion	35	5
practicum activity	70	10
informal interaction	60	8
data collection	60	8
formal feedback	70	10
Total	720	100

At Home Activities

Activities	Minutes (range)	Minutes (mean)
reading specified material	0-480	138
reading unspecified material	0-95	42
review for studying	0-200	65
Total	0-525	169

Table 25

Observed Transactions of T-R Group
For Psychomotor Learning Module

In-Class Activities

Activities	Minutes	% of Total
listening and observing	405	56
group discussion	45	6
practicum activity	75	11
informal interaction	60	8
data collection	60	8
formal feedback	75	11
Total	720	100

At Home Activities

Activities	Minutes (range)	Minutes (mean)
reading specified material	0-530	172
reading unspecified material	0-115	56
review for studying	0-180	83
Total	0-571	204

Tables 22 to 25 have reported the results of all the observed transactions. These results, along with the results from the observed antecedents and observed outcomes, constitute the total results on observations presented to the decision making group to be utilized for estimating empirical contingencies and

congruences within the descriptive matrix of Stake's Model.

Observed Outcomes (Cell #6). Observed outcomes were of two general types: cognitive outcomes measured as gain scores on multiple choice test items, and affective outcomes measured as change in the ranking between pre and post administration of the scaling instruments.

The cognitive results (gain scores) for the two groups of subjects involved in the Adult Learning module are reported in Table 26 which summarizes a correlated t test administered on the results of the pre and post scores for these two groups.

The results on the cognitive objectives reported in Table 26 show that for both groups (M-W group and T-R group) there is a statistically significant difference between means at alpha levels of 0.027 and 0.037 respectively. These are obviously both less than an alpha level of 0.05 which is selected as the decision alpha level for this data. It can be summarized for presentation to the decision making group that in fact for both groups of subjects there was shown to be a difference between means (positive gain) which is NOT attributable to sampling error.

Table 27 shows similar data for both groups of subjects involved in the Psychomotor Learning module.

Table 26

Results on Cognitive Objectives By the Two Groups of Subjects
For Adult Learning Module (Correlated t Test)

M-W GROUP

	Pre Test	Post Test
Means	21.78	27.17
Probabilities of t for Differences Between Variances		
	1	2
1	1.000	0.408
2	0.408	1.000
Probabilities of t for Differences Between Means		
	1	2
1	1.000	0.027
2	0.027	1.000

T-R GROUP

	Pre Test	Post Test
Means	22.64	26.55
Probabilities of t for Differences Between Variances		
	1	2
1	1.000	0.622
2	0.622	1.000
Probabilities of t for Differences Between Means		
	1	2
1	1.000	0.041
2	0.041	1.000

Table 27

Results on Cognitive Objectives By the Two Groups of Subjects
For Psychomotor Learning Module (Correlated t Test)

M-W GROUP		
	Pre Test	Post Test
Means	19.45	26.50
Probabilities of T for Differences Between Variances		
	1	2
1	1.000	0.271
2	0.271	1.000
Probabilities of T for Differences Between Means		
	1	2
1	1.000	0.016
2	0.016	1.000
T-R GROUP		
	Pre Test	Post Test
Means	19.82	26.41
Probabilities of T for Differences Between Variances		
	1	2
1	1.000	0.304
2	0.304	1.000
Probabilities of T for Differences Between Means		
	1	2
1	1.000	0.019
2	0.019	1.000

The results on the cognitive objectives reported in Table 27 show that for both groups of subjects there is a statistically significant difference between means at respective alpha levels of 0.016 and 0.019. Taking again a decision alpha level of 0.05 it can safely be reported to the decision making group that the differences between means (gain scores) for both

groups on the Psychomotor Learning module (cognitive objectives) were not the result of sampling. The decision as to whether or not these are large enough has to be left to the judgment made on the basis of standards established by this decision making group. The results of the selection of standards for outcomes are reported in results for Cell #11 of Stake's Model.

The observed data for affective outcomes is summarized as scale values derived from the Likert instruments. Table 28 reports the scale values and correlations between scale values derived for the Adult Learning module outcomes.

The results from the affective outcomes were consistent across groups of subjects and across modules. That is to say, in all instances there was little change between pre and post results. This is evidenced by the relatively high correlation between the pre and post results, the range being a low of 0.717 and a high of 0.980.

Use of the Evaluation Model

The employment of the evaluation model for decision making involved two main activities. Firstly, the selected group of decision makers were instructed to make estimates of the degree of: logical contingency, congruence, and empirical

Table 28

Scale Values & Correlations From Likert Instruments
For Adult Learning Module

Statements:	1	2	3	4	5	6	7
M-W Pre-test	3.211	2.737	4.053	3.947	4.105	3.368	2.632
M-W Post-test	3.579	2.737	3.947	3.842	4.368	3.789	3.421
T-R Pre-test	3.792	2.750	3.708	3.167	3.625	3.583	2.792
T-R Post-test	3.625	3.208	4.125	3.375	3.917	3.417	3.417

Correlation Between Four Sets of Scale Values

	M-W Pre	M-W Post	T-R Pre	T-R Post
M-W Pre	1.000	0.846		
M-W Post		1.000		
T-R Pre			1.000	0.717
T-R Post				1.000

Table 29 reports the scale values and correlations between scale values derived from the Likert instruments for the Psychomotor Learning outcomes.

Table 29

Scale Values and Correlations from Likert Instruments
For Psychomotor Learning Module

Statements:	1	2	3	4	5	6
M-W Pre-test	3.053	2.368	3.895	3.947	2.947	3.000
M-W Post-test	2.667	2.500	4.060	3.667	2.611	3.222
T-R Pre-test	2.583	2.292	3.875	2.792	2.625	3.250
T-R Post-test	2.440	2.320	3.920	3.880	2.560	3.240

Correlation Between Four Sets of Scale Values

	M-W Pre	M-W Post	T-R Pre	T-R Post
M-W Pre	1.000	0.900		
M-W Post		1.000		
T-R Pre			1.000	0.772
T-R Post				1.000

contingency. Secondly, this group was asked to create the data for the judgment matrix of the evaluation model. This constituted selecting standards, and based on these standards making

judgments about the two instructional activities.

To facilitate these two main decision making activities a meeting of the five decision makers was called at which a set of documents summarizing pertinent information was given to each person. Briefly stated these documents contained: a description of the Stake Model, a copy of the rationale of the in-service programs at N.A.I.T., copies of all the summarized data for the six cells of the descriptive matrix for both sample modules and instruments for data collection. These documents contained summarized data and graphic displays to make examination of the data as easy as possible. The group was also given an opportunity to ask for clarification or additional detailed information. A copy of the documents distributed at this meeting is contained in Appendix E.

To obtain results for the descriptive matrix three main questions were asked. Question #1 asked for an estimation of the degree of logical contingency that existed in the planning for each sample module. Question #2 was concerned with an estimate of the congruence between each level of the observed column. Question #3 related to an estimate of the degree of empirical contingency that was observed to exist.

Hard data for Question #1 showed that on a choice of low, medium, or high as to whether there was an adequate logical contingency the results were: low - no choices; medium - one choice; and high - four choices. Reporting these results on a

percentage basis shows that 0% chose the low category, 20% chose the medium category, and 80% chose the high category. It can be concluded that this group estimated that there was a high degree of logical contingency for BOTH sample modules. Additional comments were made by some of the group, and generally can be summarized by the following statements. "Generally the planning was well done with a good representation of the rationale of the in-service programs. There was definitely a good logical relationship between the antecedent, transaction and outcome cells, as should have been expected given the degree of previous information available to the planner (i.e. pilot study and first hand knowledge of N.A.I.T.)."

Results for Question #2 are briefly summarized in Table

30.

Table 30

Estimate of Congruence for Both Sample Modules

	Adult Learning Module			Psychomotor Learning Module		
	Low (%)	Med. (%)	High (%)	Low (%)	Med. (%)	High (%)
Antecedents	0 (0)	2 (40)	3 (60)	0 (0)	2 (40)	3 (60)
Transactions	0 (0)	3 (60)	2 (40)	0 (0)	2 (40)	3 (60)
Outcomes	0 (0)	5 (100)	0 (0)	0 (0)	3 (60)	2 (40)

It can be seen from results in Table 30 that there was generally a high level of congruence at all levels for both sample modules. There was a higher level of estimated congruence at the transaction and outcome levels for the Psychomotor Learning module. A summarization of the general comments made by the decision makers is of special interest. "At the antecedent level congruence was high except for the instance of education beyond high school for the M-W group. It was observed that in this instance there would seem to be a higher level of education than expected. At the transaction level there was obviously a high level of control for the in-class activities and a relatively lower level of control over the at-home activities. This lack of congruence for the at home activities, however, is not very critical. Group interaction was observed to be less in all instances than was expected. This is not considered very serious because of the nature of the majority of the intended outcomes. Outcomes were observed to be generally congruent, partly because the specification of intended outcomes was not competency based."

Results from Question #3 showed that empirical contingency was estimated to be high. Specifically the responses were: a) for the Adult Learning module: low - zero responses, medium - two responses, and high - three responses; and b) for

the Psychomotor Learning module: low - zero responses, medium - one response, and high - four responses. These results were consistent for the M-W and T-R groups. Comments from the decision makers on this aspect of the results were very few. Generally they suggested that where there was any lack of empirical contingency it was due to lack of more specific or detailed observations on outcomes.

The second major mandate of the decision making group was to establish standards and subsequently make judgments on each sample module program. Selection of the standards was accomplished by arriving at a group consensus, while the judgments were made on an individual basis using these common standards.

The selection of standards was made from a choice of three possible sources. These were: 1) absolute standards developed in detail by the decision making group, 2) observations on all six cells of the descriptive matrix for the pilot study conducted at Algonquin College, and 3) the standards inherent in the specification of the three cells of the intended columns for each sample module of curriculum. The group consensus choice was to use the specification of the intended columns for each of the sample modules of curriculum. This choice was recorded on each members' set of decision instruments and subsequently utilized as the basis for individual judgment decisions.

The judgment decisions are reported in Table 31.

Table 31

Judgments For Both Sample Modules of Curriculum

	Adult Learning Module		Psychomotor Learning Module	
	YES	NO	YES	NO
Antecedents	5	0	5	0 responses
Transactions	5	0	5	0 responses
Outcomes	5	0	5	0 responses

Note: YES - did meet standards

NO - did not meet standards

These judgment results are extremely consistent. This should not be surprising, since the decision making group had earlier estimated a relatively high level of congruence, and had subsequently chosen the intended column of each sample module of curriculum as the standards. General discussion with respect to the decisions was plentiful and in all instances made very few distinctions between the modules. These comments are summarized by the following six statements.

1. More detailed data on outcomes would have been useful.

2. If a data base for outcomes could be developed, these should be used as standards.

3. The affective objectives were not outlined in enough detail in the intended column.

4. A more detailed breakdown of intended and observed transactions would be desirable if more time could be devoted to establishing standards and making decisions.

5. Pre test scores on cognitive objectives were higher than one would normally expect and perhaps this fact should be incorporated in the intended antecedents.

6. I felt confident making a decision once the standards were established, however, I would have felt better about standards had we been able to identify a control program.

Results of the Meta-Evaluation

After all judgments were individually made by the decision making group, they were asked to respond individually to an instrument designed to rate the worth of the "evaluation process" (the use of the model) that they had participated in and observed. This instrument was a Likert type instrument asking for responses in reference to eleven criteria chosen for rating evaluation procedures and models. In addition to making responses

on the instrument the individuals were asked to make additional personal comments about the evaluation process.

The results from the Likert instrument are summarized in Table 32.

Table 32

Results of Meta-Evaluation (Likert Scale)

	1 Low	2	3	4	5 High	Mean
Scientific Criteria:						
Internal validity	0	0	0	3	2	4.4
External validity	0	2	0	2	1	3.4
Reliability	0	0	0	4	1	4.2
Objectivity	0	0	0	2	3	4.6
Special Criteria:						
Relevance	0	0	0	3	2	4.4
Significance	0	0	1	3	1	4.0
Scope	0	0	3	2	0	3.4
Credibility	0	0	2	2	1	3.8
Timeliness	1	1	1	1	1	3.0
Pervasiveness	0	1	1	2	1	3.6
Efficiency	0	0	1	3	1	4.0

A representative summary of the general comments made by the decision makers with respect to the "worth" of the evaluation model and process is presented here in point form.

1. I would like an opportunity to try this model out on

some of our technology courses.

2. A larger number of people from W.A.I.T. (i.e. Department Heads, for instance) should have been involved in the decision making process.

3. The model really works.

4. I would have preferred to have more time to digest all the information and perhaps have asked for additional information. Nevertheless I feel the system has worked.

5. I would be very interested in having the Heads of Departments or Program Heads use this model to evaluate programs with respect to new instructors versus experienced instructors and the first quarter courses versus fourth quarter courses. I feel the Department Heads would learn a great deal about the problems of being an instructor.

6. I personally would like to try and use this model by being "in at the start" and help to specify the intents.

7. I have learned a lot about the problems of evaluation. This model seems to help resolve many of these problems.

Summary

Results of this study have been presented under five

major headings. This was done to sort out the various kinds of data and results inherent in this study wherein developmental stages of methodology were employed. Chapter VI will present conclusions which also relate to these five categories. Recommendations arising from this study will not necessarily follow this format. A summary of the complete study is presented at the beginning of Chapter VI, followed by the conclusions and recommendations.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary of the Study

The overriding problem of this study relates to the fact that post secondary institutions have been increasing rapidly in number and size, and subsequently, the numbers of new instructional staff required has been increasing rapidly. In addition, the hiring of instructional staff has emphasized technical competence in the subject area with little concern for pedagogical expertise. Furthermore, rapid changes in technology and the continuing push for improvement in pedagogical efficiency has placed even the experienced instructor in a position wherein he or she must bring new skills to bear on these problems. This has all resulted in the problem of providing good in-service programs for many, if not most, of the instructional staff of post secondary institutions. The problem was expanded by the fact that no documented system of evaluation was available for the monitoring of modular in-service programs. This study approached the problem in whole, with an emphasis on development and evaluation of an evaluation system. This purpose constituted what has recently come to be known as meta-evaluation, the second order evaluation of an evaluation system.

Because of the complexity and developmental necessity inherent in the problem, the purpose of the study was structured to adhere to the following sequence of requirements:

- 1) develop a sample of modules of in-service curricula.
- 2) prepare an operational evaluation model.
- 3) deliver modules of in-service instruction.
- 4) use the evaluation model to evaluate the performance of the in-service curricula.
- 5) report on the results of the meta-evaluation (effectiveness of the operational evaluation model for evaluation of modules of in-service curricula).

The development of sample modules involved the selection of two topics (Adult Learning and Psychomotor Learning) and the specification of content from relevant and recent literature. In addition instructional support software for each sample module had to be prepared. Appendix A and Appendix B respectively contain the documentation for the Adult Learning module and the Psychomotor Learning module.

Preparation of an operational evaluation model constituted the major task of searching the literature for a model to serve as the foundation, and subsequently, developing the operational procedures for the utilization of the model. The review of literature relative to curriculum evaluation systems

and models was included in Chapter II. The model selected was Stake's Model. Preparation for instruction of the two sample modules of curriculum was operationally controlled by utilizing the format of Stake's Model. In other words, the "Rationale" and the "Intended Cells" of Stake's Model identified the kinds of data and subsequent preparation that was necessary.

The delivery of the sample modules constituted selecting two samples of subjects, each of which would be given instruction in each of the two modules; giving this instruction; and then collecting all the relevant data for the "Observed Cells" of the Stake Model. All data for the operational evaluation model were categorized into three main levels. These levels are antecedents, transactions and outcomes. At the termination of the delivery of the instruction data for these three levels for the intended cells and for the observed cells was collected. The instruments employed for this data collection are included in Appendix D. These data were summarized and incorporated in a set of documents (in the form of a report which is included in Appendix E) representative of the Descriptive Matrix of the Stake Model and was subsequently used for the judgment activities of the evaluation process.

The evaluation of the performance of the in-service curricula constituted employing the activities of the Judgment Matrix of the Stake Model.

Estimates of the logical contingency, congruence and

empirical contingency were made by a selected group of decision makers. This group was made up of five of the six Directors of the Institution. Their next task was to collectively select from a choice of three, that set of standards upon which to base judgments about each of the three levels of data (antecedents, transactions and outcomes). These judgments were made.

Following the completion of the judgment activities each of the persons from the decision making group was asked to participate in the meta-evaluation aspect of the study. This involved two activities: 1) responding to a Likert instrument which required an estimation of the worth of the evaluation model as measured against eleven criteria, and 2) making general personal comments as to their individual estimate of the value of this evaluation model. The meta-evaluation instrument is included in Appendix F.

Results for each of the five aspects of this study were obtained. Two sample modules were selected and prepared. An operational module was selected and according to the model proper preparation for instruction was completed. The modules of curriculum were given and all the appropriate "observation" data were recorded and summarized. A representative decision making group was able to make estimates about the relationships in the descriptive matrix of the model and they were also able to make judgments relative to the educational worth of each of the sample modules. Lastly, it was found that the decision making group was

able to rate the evaluation model against selected criteria and was able to make personal comments regarding their estimate of the worth of the evaluation model. In fact all the expected results of the study were attained.

The following section will discuss the conclusions that can be drawn from this study, and following that a discussion on recommendations is presented.

Conclusions

As was presented in the summary of the study the expected results were obtained. This in itself constitutes a major conclusion; that is, it is concluded that all five aspects of the study were in fact capable of being carried out. Results were reported for each of the five aspects of the study. It remains at this point to assess the merit or value of each of these sets of results.

The preparation of the curriculum for the sample modules was accomplished by the researcher by inclusion of content identified from the literature. This was adequate for the purposes of this study.

Preparation for delivery of instruction involved the specification of data for each of the cells of the intended column with the goal of attaining good logical contingency

between these cells. This was accomplished and subsequently judged by the decision making group to be adequate. Additional specification of the outcomes, and specifically the affective outcomes, would have been desirable. The lack of specific intended affective outcomes was noted by the decision making group. Also more detail of the intended transactions would have been useful.

Delivery of the two modules was documented by the data collection for each of the observed cells of the descriptive matrix. It was found that all data parallel to that of the intended cells was collected and summarized appropriately. Specifically the observed antecedent data were easily collected and summarized. The observed transaction data was all collected with a high degree of confidence that it was both valid and reliable. Validity is estimated by the extent to which the observed data parallels categories established for the intended transactions. Reliability was estimated to be good on the basis that similar data for different groups was attainable, and corresponded with the expectations identified earlier. Observed outcomes were measured using prepared instruments. It was not possible to select standardized instruments for this unique data collection task. However, the results of the pilot study, including an item analysis for the multiple choice tests and comparative results for two types of instruments (Likert Scale and Paired Comparison Scale), showing similar results, increased the researcher's confidence in all the instruments used. The

developmental stage of the evaluation process under study does not require that at this time standardized instruments be used, the major results at this time being that in fact the model does allow for and account for all the data that of necessity must be collected. Refinement and improvement of instruments to be employed within the model should, however, be considered wherever possible.

The results for the utilization of the evaluation model for decision making are encouraging. Firstly, the decision making group was consistently able to determine that in fact a high degree of congruence did exist in both sample module offerings. The group estimated that there was for all levels (antecedents, transactions and outcomes) a relatively high degree of congruence. In addition they were able to estimate a high degree of empirical contingency for both offerings. The significance of these related conclusions is that the procedure employed was operational, and that each of the members of the decision making group felt comfortable with the procedure. The direct results obtained were evidence that the offerings had some merit; however, this conclusion is secondary to the conclusion that agreement was attainable.

Further to the decision making process it was concluded that the processes of selecting a set of standards and making subsequent judgments was accomplished. A possible opposite conclusion would have had to have had a "hung jury" with respect to

the overall and specific merit of the two modular offerings. In addition to being able to make a consensus decision as to which set of standards to use, there was obvious consistency in the subsequent individual judgments. Also, each member of the decision making group felt satisfied with the process, and in fact, in most instances was enthusiastic about the possibility of utilization of the process in the future.

Conclusions relative to the meta-evaluation aspect of this study should be stressed. Upon examination of the results of the meta-evaluation instrument it can be seen that in general the process and model examined in this study was considered to be fairly highly rated on most of the eleven criteria. Certainly for all criteria except "timeliness" the ratings were above mid point (the average rating being above the 3.0 rating). Ratings on six of the eleven criteria were at the 4.0 rating or above, with the criteria having the highest rating being "objectivity" (4.6). The relatively low rating on the "timeliness" criteria came about from an evenly distributed set of ratings from low to high. Subjective responses from the individual judges with respect to this criteria showed a wide range of different interpretations as to what context "timeliness" should be rated. Two judges felt that the evaluation of the in-service modules should have been made available to W.A.I.T. administrators much earlier. The other three felt that the model could function in a normal context in such a way to provide data in reasonable lengths of time. They did disagree somewhat as to what "a reasonable length of time"

was. Obviously the results relative to the worth of the evaluation process or model with respect to timeliness are inconclusive.

In addition to the results on the meta-evaluation instrument there were many significant subjective statements made by each of the decision makers. Some relative conclusions drawn from these statements are: 1) the model as employed works well for attaining meaningful judgments about in-service modular programs, 2) improvements in data collection will add to the usefulness of the model, 3) it would be expected that this model would operationalize and function in other evaluation contexts and most decision makers would like to try it in some of these other contexts, 4) the more experience a decision maker has with the model the better able he would likely be at using the model, 5) if more judges were involved the results would probably be similar but the effective impact of the decisions would be greater.

The conclusions drawn from this study generally evolve to relate the overriding conclusion that, in fact, the evaluation model does function for the evaluation of in-service modular programs; and that it, in fact, rates fairly highly against universal criteria with respect to the overall worth of the evaluation tool. The recommendations that follow will attempt to suggest procedures and activities which would improve the rating of this evaluation model on these universal evaluation criteria.

Recommendations

The recommendations from this study are presented in two groups: the first group dealing with recommendations that relate to specific findings in the study, and the second group reflecting a more overall relationship to the study.

Specific Recommendations

1. Stake's Model as it was operationalized in this study should be utilized for both formative and summative evaluation of in-service programs at post secondary institutions.

2. Data bases should be developed upon which standardized instrumentation can be developed for all categories of data collection described by the operational model of this study. It is imperative that this be accomplished because at the present time there is relatively no standardized instrument available for this adult context.

3. More specific categories of data for all cells need to be collected.

4. Competency based testing should be employed for the measurement of outcomes.

5. The utilization of techniques to analyze competency

based data (non-normative data) needs to be perfected. This is essential if truly modular programs are to be developed and evaluated.

6. Group processes should be employed to assist in the initial development of curricula or, in other words, the initial specification of the intended cells in order to ensure a greater measure of relevance.

7. Data collection techniques for all stages of the evaluation model need to be streamlined so that reports, decisions and dissemination can be done as quickly as possible to improve the timeliness of implementation of any results.

8. A simple document which briefly describes the concepts and processes of the operational model should be produced to be distributed to all those involved in the use of the model. This document should be distributed to all those who might be involved at the beginning stages of an evaluation activity.

General Recommendations

1. In any adult context the operational evaluation model should be employed to negotiate content and process of programs with the learner clientele. It would be useful to have the adult clientele: examine their collective backgrounds and the other resources available (intended antecedents); determine what content or outcomes they would individually and collectively wish

to achieve (intended outcomes); and determine the learning activities they feel are necessary to accomplish their objectives (intended transactions). The researcher feels the utilization of the evaluation model in this fashion would result in optimum planning for any specific adult learning group, and would make formative evaluations of the program a rewarding and cooperative endeavor. The clientele would assist in the collection of the observed data and the preparation of a summary. It would still be advisable to have a "blue chip" group of decision makers to make any summative evaluations which are deemed necessary.

2. It is further recommended that formative evaluation conducted within the guidelines of the operational model employed in this study be an integral function of every curriculum development project. It is felt that this model is both effective and efficient, and above all, encompasses activities that give it impact. The fact that people from all levels of the educational institution (or a like environment) have roles to play in this process leads to the conclusion that the results of evaluation stand a good chance of implementation. One of the greatest payoffs of the use of this model is the enlightenment of all those involved.

3. The operational model should be utilized in a variety of contexts and subsequent further meta-evaluation be conducted with the goal of improving the universal application of the model.



BIBLIOGRAPHY

- American Association for the Advancement of Science Commission on Science Education, Science-A Process Approach: The Process Instrument, New York: Xerox Education Division, 1969.
- Atkin, J. Myron. Some Evaluation Problems In A Course Content Improvement Project. In Peter A. Taylor and Doris W. Cowley (eds.), Readings in Curriculum Evaluation. Dubu que, Iowa: Wm. C. Brown Company Publishers, 1972.
- Borgen, Joseph A. and Davis, Dwight E. A Research and Development Project in Occupational Education: The Development of Process Models for Decision-Making in Curriculum Development and Evaluation. Final Report of Phase I. Joliet Junior College, Illinois, September 1970. (ERIC Document No. ED50270)
- Chertow, Doris S. (ed.) Evaluation As A Non-Sacred Cow: A "Practical" and Feasible Adult Education Improvement Method. Publication Program in Continuing Education, Syracuse University, New York,
- Cox, C. Benjamin. A Design for Evaluation: A Case Example. Indiana Social Studies Quarterly, autumn 1971, 24 (2), 5-12.
- Cronbach, L. L. Course Improvement Through Evaluation. In Peter A. Taylor and Doris W. Cowley (eds.), Readings in Curriculum Evaluation. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1972.
- Gagné, R. M. The Conditions of Learning. New York: Holt, Rinehart and Winston, 1965.
- Gronlund, Norman E. Stating Behavioral Objectives for Classroom Instruction. Toronto: Collier-MacMillan Canada Ltd., 1970.
- Guba, Egon G. and Stufflebeam, Daniel L. Evaluation: The Process of Stimulating, Aiding and Abetting Insightful Action. Measurement and Evaluation Center in Reading Education, Indiana University, Bloomington, Indiana, June 1970. (ERIC Document No. ED055733).
- Mackay, D.A. and Maguire, T.O. Evaluation of Instructional Programs. Alberta Human Resources Research Council, May 1971.

Manuel, D. W. Scale Values of Perceived Importance of In-Service Modules. University of Alberta. Unpublished Paper, 1972.

Meese, M. Kathryn. A Model for Assessing Complex Educational Outcomes. Paper presented at the Annual Meeting of the American Educational Research Association, New York, New York, February 1971.

Michael, Wm. B. Educational Evaluation and Decision Making. In Daniel L. Stufflebeam, Critique of the Report of the Phi Delta Kappa Study Committee on Evaluation. Paper presented at the Annual Meeting of the American Educational Research Association, New York, New York, February 1971.

Parsons, Theodore W. and Tenenberg, Morton S. Conceptual Structure for Research on Curriculum Implementation. Paper presented at the American Educational Research Association Annual Conference, Minneapolis, Minnesota, March 1970. (ERIC Document No. ED040095).

Pohland, Paul A. Educational Ethnology and Education. Paper presented at the American Educational Research Association Symposium on Anthropological Approaches in Educational Research, Minneapolis, Minnesota, March 1970.

Provus, Malcolm M. The Discrepancy Evaluation Model. In Peter A. Taylor and Doris W. Cowley (eds.), Readings in Curriculum Evaluation. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1972.

Scriven, Michael. An Introduction to Meta-Evaluation. In Peter A. Taylor and Doris W. Cowley (eds.), Readings in Curriculum Evaluation. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1972.

----- The Methodology of Evaluation. In Ralph Tyler, Robert Gagné and Michael Scriven (eds.), Perspectives of Curriculum Evaluation. American Educational Research Association Monograph Series on Curriculum Evaluation, No. 1 Chicago: Rand McNally and Company, 1967.

----- Evaluating Higher Education in California. California State Legislature, Sacramento: Joint Committee on the Master Plan for Higher Education, April 1973. (ERIC Document No. ED076119).

----- Evaluating Program Effectiveness Or, If the Program is Competency Based, How Come The Evaluation Is Costing So Much? March 1974. (ERIC Document No. ED093866).

- The Methodology of Evaluation. In R. E. Stake (ed.), American Educational Research Association Monograph Series in Education. No. 1 Chicago: Rand McNally, 1967, 39-89.
- Stake, Robert E. The Countenance of Educational Evaluation. Teachers College Record, 1967, 68, 523-540.
- Toward a Technology for the Evaluation of Educational Programs. In Ralph Tyler, Robert Gagné and Michael Scriven (eds.), Perspectives of Curriculum Evaluation. American Educational Research Association Monograph Series on Curriculum Evaluation, No. 1, 1-12, Chicago: Rand McNally and Company, 1967. (ERIC Document No. ED030948).
- and Gooler, Dennis Measuring Educational Priorities. Educational Technology, September 1971.
- Stufflebeam, Daniel L. The Relevancy of the CIPP Evaluation Model for Educational Accountability. Paper presented at the Annual Meeting of the American Association of School Administrators, Atlantic City, New Jersey, February 1971. (ERIC Document No. ED062385).
- Critique of the Report of the Phi Delta Kappa Study Committee on Evaluation. Paper presented at the Annual Meeting of the American Educational Research Association, New York, February 1971. (ERIC Document No. ED056074).
- Toward a Technology for Evaluating Education. Paper presented at the American Educational Research Association Annual Meeting, Chicago, April 1974. (ERIC Document No. ED090319).
- Toward a Science of Educational Evaluation. Educational Technology, July 30, 1968, 8.
- Taba, Hilda. Curriculum Development: Theory and Practice. New York: Harcourt, Brace and World, 1962.
- and Sawin, E. A Proposed Model in Evaluation. Educational Leadership, 1962, 20, 57 - 71.
- Tanner, C. Kenneth. Program Evaluation in Cost Benefit Terms. Paper presented at American Educational Research Association Annual Meeting, Minneapolis, Minnesota, March 1970. (ERIC Document No. ED042228).

Taylor, Peter A. and Cowley, Doris W. (eds.). Readings in Curriculum Evaluation. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1972.

Taylor, Peter A. and Maguire, Thomas O. A Theoretical Evaluation Model. In Peter A. Taylor and Doris W. Cowley (eds.), Readings in Curriculum Evaluation. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1972.

Torgerson, W.S. Theory and Methods of Scaling. New York: John Wiley and Sons, 1958.

Tuckman, Bruce W. The Development and Testing of an Evaluation Model for Vocational Pilot Programs. Final Report. (Report No. BR-6-8355-PR-2) Rutgers, The State University, New Brunswick, New Jersey, April 1967. (ERIC Document No. ED014567).

Uffelman, Robert L. A Model for Analyzing and Comparing Instructional Strategies and Programs. Paper presented at the 43rd Annual Meeting of the National Association for Research in Science Teaching, Minneapolis, Minnesota, March 1970. (ERIC Document No. 040043).

Wentling, Tim L. and Klit, John A. Meta-Evaluation Applied: The Evaluation of a Large Scale Evaluation System. A paper presented at the American Educational Research Association Convention, New Orleans, Louisiana, February, 1973. (ERIC Document No. ED075509).

APPENDIX A
ADULT LEARNING MODULE

Module #1 Adult Learning

- a. Each learner will be able to identify the essential characteristics of adult learners and be able to use this knowledge to help design and conduct good adult education programs.

Activities Code

Instructional Objectives

<u>1 L 1</u> 1 R 1 1 R 2 1 R 3 1 R 4 1 R 5 1 R 9 1 R 6 1 R 7 1 L/S 2 1 P 1	I Each learner will comprehend the essential characteristics of adult learners by being able to: a) identify several generalizations about adult intelligence. b) identify the features of two major kinds of memory processes and how they typically operate within the adult learners; and be able to hypothesize as to which one(s) of the four theories of forgetting play a significant role in the forgetting patterns of typical adult learners. c) examine various hierarchies of learning sequences and specifically relate R. M. Gagné's "Conditions for Learning" to the immediate problems of curricula being taught at the present time. d) discuss and criticize the general theories of motivation; and be able to relate Maslow's hierarchy of basic needs to the needs of typical adult learners. e) List, discuss, and defend several generalizations about the psychological characteristics of adult students you have worked with during the past year; and relative to these generalizations, be able to hypothesize some possible implications for designing and conducting adult education programs.
<u>1 L/S 3-</u> 1 R 8	II Each learner will comprehend and apply the essential considerations relative to designing instruction for adult education programs by being able to: a) identify the sources of <u>valid</u> content for adult education courses.

- b) select and help others select appropriate learning tasks.
- c) select and plan for a variety of valid instructional processes.
- d) prepare appropriate instructional objectives for adult learning programs.

1 R 8
1 L/S 4

III Each learner will comprehend and apply the essential considerations relative to managing instruction for adult education programs by being able to:

- a) establish procedures and guidelines for appropriate guidance of adult learners.
- b) establish procedures and guidelines for appropriate feedback to adult learners.
- c) establish and maintain a learning environment suited to the characteristics and needs of adult learners.

Assigned Reading References

ADULT LEARNING MODULE

- 1R1 Intelligence and the Adult Learner.
(Copy Included - 5 pages).
- 1R2 Bayley, Nancy. "Growth of Abilities into Adulthood";
Analysis of Concept Learning, Academic Press, New York,
1966, 164 - 173.
- 1R3 Craik, F.I.M. and Masani, P.A. "Age and Intelligence
Differences in Coding and Retrieval of Word Lists";
British Journal of Psychology, 1969, 60, 315-319.
- 1R4 Charles, Don C. "The Older Learner". The Educational
Forum, 1971, 227 - 233.
- 1R5 Memory and Forgetting. (Copy Included - 3 pages).
- 1R6 How Do Adults Learn. (Copy Included - 4 pages).
- 1R7 Adult Learning and Maslow's Concepts. (Copy Included - 7 pages).
- 1R8 Creating a Good Climate for Learning. (Copy Included - 7 pages).

The literature shows that psychologists differ rather widely as to the effects of age upon intellectual capacity or the power of the individual to learn. It shows also that there exists among the older people, as well as the general population, long-accepted stereotypes of the aging which tend to picture the older person as one whose physical and mental capacities are deteriorating and whose general interest in life is gradually diminishing. Research up to this time has not been sufficiently extensive or intensive to give unequivocal evidence of the influence of age upon intellectual capacity. (5)

Thorndike (4) some twenty-five to thirty years ago did considerable research on the question and his conclusions were as follows:

1. The acme of ability (to learn) is reached at some point between twenty and twenty-five years of age. (See Figure 1.)
2. There is a decline in capacity for learning from the acme (twenty to twenty-five years) to about forty-two years of age of from 13 to 15 per cent, or approximately one percent per year.
3. The influence of intellect upon the curve of ability to learn in relation to age is very slight. The ablest man and the ordinary man show very nearly the same curve.
4. Individuals on the average probably learn much less from twenty-five to forty-five than they did from five to twenty-five. This is attributable to various combinations of four factors: general health and energy, ability to learn, interest in learning, and opportunity for learning.
5. By the age of twenty-five most persons have, within certain limitations, learned a great deal of what they wish to learn.

Following World War I, Jones and Conrad (2) administered the Army Alpha Tests to 1,191 unselected rural New England subjects from ten to sixty years of age and when the results were plotted against chronological age it showed rapid intellectual growth to about sixteen years, a negative acceleration to about eighteen or twenty years, and a gradual but steady decline thereafter. The performance at the fifty-five year level was about the same as that of the fourteen old. The subtests on vocabulary and general information failed to exhibit a post-adolescent decline, as did the other tests. The most rapid decline was found to be analogies, common sense, and numerical completions. Jones and Conrad concluded that the tests on vocabulary and general information were the least valid indications of intelligence, and considered their findings as confirming Thorndike's conclusions--that intelligence declines steadily beyond the age range twenty to twenty-five years. They also concluded that speed was an unimportant factor in the measurement of intelligence.

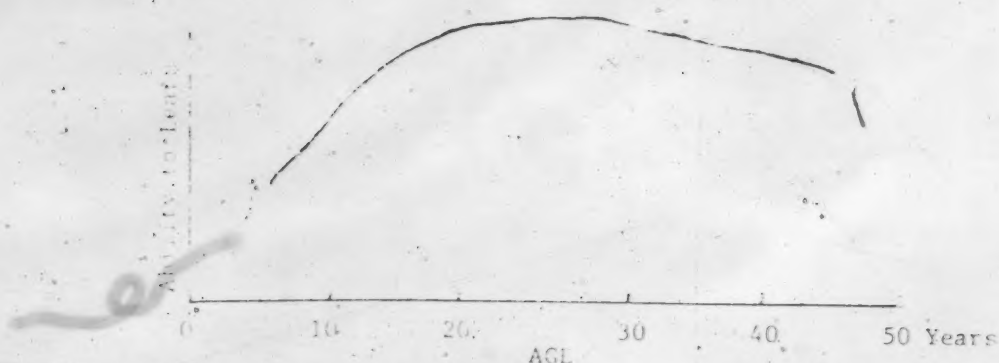


FIGURE 1 -- THE GENERAL FORM OF THORNDIKE'S CURVE OF ABILITY TO LEARN IN
RELATION TO AGE

Boulds and Raven (1) administered the 1938 Progressive Matrices and the Mill Hill Vocabulary Scale to 1,047 engineers and 920 male employees of an industrial firm--one competitive and one non-competitive in situation. The rate of decline in the Matrices Test was uniform from age twenty-five on; the vocabulary scores showed a constant rise to about thirty, with little decline to age sixty. On the basis of this they concluded:

1. The average person's ability to form comparisons and reason by analogy increases rapidly during childhood, reaches its maximum at about age fourteen, remains constant to about age twenty-five and then declines steadily to age sixty and then more so to eighty, at which age the average person can reason by analogy about as well as an eight year old.

The ability to recall information increases normally up to age twenty-five and remains constant for twenty-five to thirty years.

Miles and Miles (3) cite the results of intelligence tests by many investigators as giving what they consider to be clear-cut evidence of the following:

1. Score decline from young adulthood to old age.
2. Greater decrement of "speed" versus "power" of intelligence.
3. Better preservation with age of the verbal as compared with the mathematical and manual functions.
4. Wide individual differences in score at every age.

In connection with age-score curves on intelligence tests, Miles makes the following observations:

1. If speed of reaction or youthful vigor is essentially involved in the test performance, decrement begins to appear early in adulthood, is continuous, and tends, in later age, to become excessive.
2. On the untimed, or "power" tests of intelligence, score decrement occurs with age, but the rate of decline is slower.
3. The average decade scores of men and women are generally about equal whatever test is used, and they describe about the same decrement curve.
4. At every adult age the best and the poorest scoring 25 per cent differ from the average by an amount that is more than three times the usual decade to decade loss.

With respect to learning, Miles points out that learning ability is closely correlated with intelligence. He says that training utilizes capacities and practice maintains them. Measured ability to learn is maintained slightly better than the capacity to do mixed problems of the intelligence test type. If learning were required of all people in all subjects, the decline of competence with age might be similar to that of intelligence test capacity. Since learning is selective, however, and generally follows interest, the waning of capacity is retarded by the favorable factors which motivate the choice of material to be learned.

Learning obviously depends upon attention, retention, and recall, says Miles. That these separate elements show greater decline with age than does learning itself simply means that in the latter other factors are also involved. Wanting to learn is the greatest aid to learning. Interest in the subject to be learned aids in the mental organization necessary for attention and retention. Attitude, interest, and motivation are better sustained as age advances than is the speed of activity, and they tend to channelize and conserve effort in the direction of organized patterns of experience. In childhood, active, varied learning is the rule; in maturity, active learning is usually practiced in areas defined in terms of interest.

There is no veto power over learning exercised by age at any period in the normal life span, according to Miles. While experimental psychologic results are in agreement in indicating age decrements in adult learning, at the same time they definitely support the formulation that no one is ever too old to learn.

Donahue (6) makes the following eight observations with respect to intelligence and learning in the aging:

1. The general age curves for psychological functions are parabolic in shape.
2. The same abilities decline at different rates in different persons.

3. Judgment and reasoning ability reach their peak latest of all abilities.
4. Age differences, and age changes have frequently been confused.
5. There is good evidence to support the view that the greater the individual's intellectual endowment and the greater the amount of education, the less steep is the decline in intellectual ability, other things being equal.
6. Exercise of the mind seems to retard deterioration of intellectual processes.
7. If minds are kept active through exercise of intellectual and creative imagination, outstanding achievements in fields not involving physical powers is possible in the seventh and perhaps even the eighth decade.
8. The older adult can continue to learn meaningful things; comprehension of difficult reading shows little or no change with age; but there is a decline in ability to remember isolated facts.

- (1) Foulds, G. A., and Raven, J. C. "Normal Changes in the Mental Abilities of Adults as Age Advances," Journal of Mental Science, XCIV (1948), 133-142. Dumfries, Scotland: The Crickton Royal. Psychological Abstracts. XXII (1948), 4882.
- (2) Jones, Harold E., and Conrad, Herbert S. "The Growth and Decline of Intelligence" A Study of a Homogeneous Group Between the Ages of Ten and Sixty," Genetic Psychology Monograph. Vol. XIII, No: 3 (March, 1933).
- (3) Stieglitz, Edward J. (ed.). Geriatric Medicine. Philadelphia: W. B. Saunders Company. 1949. (Chapter 3: "Psychological Changes of Normal Aging," by Anton J. Carlson.) (Chapter 5: "Mental Changes with Normal Aging," by Walter R. Miles and Catharine C. Miles.) (Chapter 17: "Normal Mental Changes," by Winfred Overholser.)
- (4) Thorndike, Edward L. Adult Learning New York: The Macmillan Company, 1936.
- (5) Tibbitts, Clark and Donahue, Wilma. "Developments in Education for Later Maturity," Review of Educational Research. Vol. III, Chapter II, (June, 1953).
- (6) Tibbitts, Clark (ed.) Living Through the Older Years. Proceedings of the Charles A. Fisher Memorial Institute on Aging. Ann Arbor: University of Michigan Press, 1949. (Chapter IV: "Changes in Psychological Processes with Aging," by Wilma Donahue.)

MEMORY AND FORGETTING

1 R 5

Memory

Memory is the storage of learned material in the brain until such time as it is needed and it functions on two levels:

1. Short-term memory - which retains learned material only briefly such as is the case when we look-up and dial a telephone number. After a few moments in the short-term memory system the learned material is either transferred to the long-term memory or forgotten. This memory system is limited in the amount of material it can hold at any one time but over the years it processes a vast amount of material. Because of this, age tends to influence short-term retention.

2. Long-term memory - is the more or less permanent depository for learned material from the short-term memory system. In order for material to be retained and available for use a memory trace must be established, consequently instruction must be designed so as to establish this trace.

The long-term memory system operates in two different ways:

1. Recognition memory through which we are able to recognize previously learned material.
2. Recall memory whereby we are able to reproduce or reconstruct material that has been learned.

Recognition memory has a greater capacity than does recall memory. This is readily evident if you think of the differences between your reading and listening vocabulary and your speaking or writing vocabulary.

Because all experiences may become part of the memory, older adults have more material stored in the long-term memory than do those younger; consequently, it is more difficult to remember specific learned material quickly.

New material should always be learned in the way it will be needed for use. Thus, an item that will be used in isolation should be learned in isolation and that used in series should be learned in series. Furthermore, much of the material learned will be needed only through recognition so it should be taught for recognition rather than for recall.

Since use affects retention, it is crucial that all new material be put to use immediately as it is learned. Through the use of new learning we can help establish the memory trace that will aid in remembering. The best time to learn anything is immediately before it is required for use.

Finally, material is learned and retained better if the new material is perceived as meaningful to the learner. Meaningfulness is achieved when the learner understands the material, can see its relationship to what has been learned previously and to his goals or objectives, or when it is aware of its practical utility to himself. Because adult learners have a vastly greater prior knowledge and experience it is easier to establish the meaningfulness of new material. Group discussion is a particularly useful way of establishing meaningfulness with adult learners.

In adults we encounter a particularly difficult problem with respect to the interference effect of prior learning. Material once learned and forgotten may interfere with new learning. If a new skill to be learned is similar to a previously learned skill the previous learning will impede the new learning. In such a case, it may be necessary to devote time to unlearning the old before the new can be mastered. This problem is rarely encountered among the young but is frequent among adults. It also may explain some of the difficulties adults have with certain learning tasks.

Forgetting (summary)

1. When we remember something we may show the marks of earlier memory in several ways. Redintegrative memory, or the recollection of a personal event, reconstructs a past occasion not only in terms of its content, but of its setting in time and place. Such rich memories have been little studied in the psychological laboratory. Much easier to test are recognition, requiring only a sense of familiarity, and recall, requiring a reinstatement of something learned in the past. Saving in relearning is another test for the influence of prior learning.

2. The course of forgetting has been studied chiefly for material learned by rote, or, as we say, committed to memory. The most usual form of the curve of retention is that of rapid forgetting at first, followed by decreasing losses. The form holds for different sorts of materials, but the time axis differs. About as much forgetting of non-sense syllables may occur in a day as occurs in a year from the more meaningful substance of a college course.

3. Under some circumstances there is an initial rise in the curve of retention. A retention curve of this form-the rise before the curve begins to fall-is called a reminiscence curve, without implying an explanation of "reminiscence".

4. Four theories that seek to account for forgetting have been proposed: (1) the theory of passive decay through disuse, (2) the theory of systematic distortions of the memory trace, (3) the theory of retroactive and proactive inhibition, and (4) motivated forgetting (illustrated by repression and the effect of goal tensions on retention).

These four theories are supplementary, rather than contradictory, and each calls attention to important features of forgetting. The memory trace is purely hypothetical, and has not been identified in the nervous system.

5. Most of the improvement in retention comes about through improved methods of fixating the material in the first place, and in part through practice in recall. It is doubtful if there is any change in basic retentivity, though little is known with any assurance about the nature of this underlying basis for memory.

6. The rapidity of memory loss is lessened by active recall during learning, by periodic reviews, and by overlearning beyond bare mastery. Logically understood material is retained much better than material learned by rote.

HOW DO ADULTS LEARN?

"We learn by doing."

"Experience is the best teacher."

Slogans like these have more than a germ of truth in them. They represent wisdom distilled from human experience over a long period of time.

Learning is change - change in an individual's behavior. Behavioral changes do not truly become a part of a person until he has reinforced them through use. For example, a student can memorize the operation of a piece of equipment or a new word for his vocabulary. But he doesn't actually "learn" those things until he practices operating the equipment or using the new word. The student, in short, must be involved in the process of learning.

Motivation probably is the most important element of learning.

Motivation is the drive which forces a person to move toward a goal. It makes a student want to know, to understand, to believe, to act, to gain a skill.

Most adult students are self-motivated; they attend an adult class because they want to, not because they have to. Yet, because many adults doubt their ability to study and learn or because they fear exposure and ridicule, they need constant re-motivation.

A teacher must recognize the importance of motivation and find ways to bring motivation factors into the learning process. Some of these factors are: the need for security, the need for new experience, the need for recognition, the need for self-esteem, the need for conformity, and the need to help others.

The Laws of Learning

There are a number of very basic psychological laws which control and affect student learning. If you hope to achieve any real measure of success in teaching adults, you must understand these laws. Using them, you can make the learning experience more effective, lasting, and enjoyable for students.

The law of effect - People tend to accept and repeat those responses which are pleasant and satisfying and to avoid those which are annoying. If an adult enrolls in a course expecting to learn a new skill, for example, and quickly finds that he is learning it and enjoying the learning process, he will tend to want to keep returning to class. Moreover, he probably will want to enroll in more courses upon completing the first one. In short, "Nothing succeeds like success." You can help your students experience some personal satisfaction from each learning activity and achieve some success in each class period as you help them master a new idea or operation.

The law of primacy - First impressions are the most lasting. This means that those first classes are all important. Early in the course you will find it helpful to arouse the students' interest in the subject matter by giving them an opportunity to discuss their need for the course. You will also want to be sure that the students learn the content right the first time.

The law of exercise - The more often an act is repeated the more quickly a habit is established. Practice makes perfect - if the practice is the right kind. Practicing the wrong thing will become a habit too - one that's hard to break. You should be sure that your students are performing an operation correctly.

The law of disuse - A skill not practiced or a knowledge not used will be largely lost or forgotten. You should recognize the value of repetition for reinforcing newly gained knowledge or skills. Studies have shown that the period immediately following the learning process is the most critical. Important items should be reviewed soon after the initial instruction.

The law of intensity - A vivid, dramatic, or exciting learning experience is more likely to be remembered than a routine or boring experience. This does not mean the classroom should be a circus or a theatre-in-the-round.

But, on the other hand, the teachers whose subjects are longest remembered are those who had the ability to "bring their subjects alive." By using vivid examples and other supporting material, your teaching can be dramatic and realistic.

Blocks To Learning

In addition to the psychological laws of learning mentioned above, there are feelings, emotions, and attitudes in students which may be blocks to learning. Some of these cannot be controlled by you but the following ones can:

Boredom - The work may be too easy or too hard. The teacher may have failed to motivate the students or to keep their attention.

Confusion - The teacher may create confusion by presenting too many or overly complex ideas. Contradictory statements or failure to relate one step to another also can confuse students.

Irritation - Annoying mannerisms of the instructor, poor human relations, interruptions, and delays can create this block.

Fear - Fear of failure, of ridicule, or of getting hurt are common blocks to learning. It is important to make sure that each student shows some success in each session.

Human Relations And Learning

Student emotions come out in many ways, and it is important for the teacher to recognize these ways. Some of them are: Projection (finding someone else or something else to blame for a weakness - maybe the leader), rationalization (finding an explanation which sounds reasonable but does not get to the real base of the matter), aggressiveness (anger, contempt, discourtesy, loudness), flight (escape from a frustrating situation . . . finding an excuse to stay away from class), resignation (giving up . . . showing little or no interest in the class).

You can help overcome many of these blocking mechanisms by following four basic human relations practices:

1. Help students set reasonable standards for themselves which they can achieve. Most people want to be better than average but, obviously, this is impossible for all if there is to be an average. The teacher should help the student identify those isolated areas in which the student excels and help him realize that satisfaction gained from competence in one area makes up for average ability in another.
 2. Help students help themselves. Students sometimes flounder, become frustrated and turn to the teacher for help. The teacher then should be warm and understanding but help the student figure out the difficulty for himself - not work it out for him. This offers an opportunity for development on the part of the student.
 3. Keep students informed. Share with your students the plan for the entire course so they will know what is going on and what to expect. Seeing the big picture helps them understand each part of it.
 4. Encourage the students to tell you how they see you as a leader of the learning group ...ways in which your teaching methods are helpful ...and ways in which you could be of still more help.
- Finally, in adult education, the Golden Rule holds as true as ever.

Treat your students as you, an adult, wish to be treated.

ADULT LEARNING AND MASLOW'S CONCEPTS

I. Maslow's Psychology of Being

A. The Problem as Seen by Maslow

The problem of therapists and teachers is one of helping adults to become what they can and deeply need to become - mature, self-actualized, fully-functioning humans.

B. Underlying Assumptions and/or Propositions

1. Each of us have an "essential inner nature which is instinctoid, intrinsic, given, 'natural'" in the sense that it has an appreciable unchanging hereditary determinant (4: CH. 7). This inner nature includes instinctoid basic needs, capacities, talents, and physiological and neurological givens. "This inner core shows itself as natural inclinations, propensities or inner best." (5: p. 190).
2. This inner nature and its potentialities must be seen developmentally. It is actualized, shaped or stifled by culture, family, environment, learning, etc.
3. This inner core of impulses is weak and easily overcome or repressed.
4. Each person's inner nature is in part idiosyncratic and in part shares its characteristics with all humans.
5. It is possible to study this inner nature scientifically and objectively.
6. Many aspects of this inner nature are either: a) actively repressed because they are feared or disapproved of, or are b) positively forgotten.
7. Though weak and suppressed this inner nature rarely dies. "It has a dynamic force of its own pressing for open uninhibited expression. This force is fundamental to the urge to grow, the pressure toward self-actualization, the quest for identity. It is this that makes . . . education and self-improvement possible in principle." (5: pp. 192-3).
8. This inner self grows partly by discovery of its biologically-based potential and partly as a consequence of the choices made by the individual. "The person, insofar as he is a real person is his own main determinant." (5: p. 193)

Poor Copy

9. If the essential core of a person is frustrated, denied or suppressed sickness and/or regression results.
10. A person's inner nature is neither "evil" or "good" it is "prior to good or evil."
11. Intrinsic guilt is necessary as a guide for growth toward actualization of the self.
12. "evil" behavior, e.g. indiscriminate destructive hostility, is reactive. Angry behavior is not "evil" when the external situation warrants it.
13. Primary process cognition, regression can be good, beautiful and desirable.
14. For psychological health it is essential that the inner nature of a person be sufficiently accepted, loved and respected by others and by himself. (Note: the converse is not necessarily true).
15. It is best to encourage, or at the very least, to recognize this inner nature. While recognizing a need for a balance between spontaneity and control, Maslow feels that social and natural controls are "transcended and became aspects of spontaneity" in the self-actualized person. Such transcended controls "do not call into question the desirability of the gratification but rather enhance pleasure by organizing, estheticizing, pacing, styling and savoring the gratification". (5: p.198).
16. Given free choice, a healthy person will choose what is good for his growth.
17. "... the main path to health and self-fulfillment for the masses is via basic need gratification." (5: p.199).
18. Complete absence of frustration, pain or danger is dangerous. To be able to perceive physical reality, to be cognizant of our strengths and limitations, and to be able to love and yet enjoy the loved one's need-gratification as well as one's own requires the acquisition of frustration-tolerance.
19. Capacities as well as health organs and organ systems "need" to be used and exercised if an individual is to grow.
20. An aspect of health is the ability to accept the existence of, and live in, both the natural and the psychic worlds.

21. Immaturity from a motivational standpoint is the process of gratifying the deficiency-needs, (security, belonging, self-esteem) in their hierarchical order. Maturity, or self-actualization, is a transcendence of these deficiency needs.
22. Immaturity can also be differentiated from maturity in terms of cognitive, emotional and motivational capacities - i.e., D - cognition, D - love and D - motivation are characteristic of immaturity while B - cognition, B - love and B - motivation are mature capacities.
23. "No ideally good relation to another human being especially a child, is possible without B - love." (7: p.203).
24. While in principle self-actualization is easy, it occurs in less than 1% of the adult population. (7: p.204).
25. Since growth holds not only rewards and pleasures but also intrinsic danger, pain and effort, it requires courage, will, choice, and strength as well as protection, permission and encouragement from the environment.
26. An empirical description of the deepest tendencies of the human species and of specific individuals implies a naturalistic system of values.
27. A neurosis is not part of the inner nature of man but a defence against it or an evasion of it, as well as a distorted expression of it under the aegis of fear.
28. The state of being without a system of values is psychopathogenic.
29. At the level of self-actualizing, many dichotomies became resolved, opposites are seen to be unities and the whole dichotomous way of thinking is recognized to be immature.
30. In healthy people the conative, the cognitive, the affective and the motor are less separated from each other and are more synergic.
31. Development of a healthy unconscious and of a healthy irrationality sharpens our awareness of the limitations of purely abstract thinking, of verbal and analytic thinking.
32. One of the main conditions of creativity is the ability to dip into the unconscious and preconscious, to use and value their primary processes and impulses.

33. Esthetic perceiving and creating and esthetic peak-experiences are seen to be a central aspect of human life and psychology because a) since peak-experiences are integrative they are moves toward health, b) they are life-valuing, c) they have value in themselves.
34. With increasing maturity health human beings move from neurotic pseudo-problems to the real unavoidable existential problems inherent in the nature of man (even at his best) living in a particular kind of world.
35. All humans do not actualize themselves in the same way.
36. To the extent that it gratifies all basic human needs and permits self-actualization, a culture is growth-fostering. Non-gratifying cultures are growth-inhibiting.
37. The condition of fullest harmony (merging with a larger whole) is full autonomy.
38. The mature, self-actualizing person lives part of his life in an inner, out-of-time and out-of-the-world psychic world and yet is able to adapt easily and enjoyably to the real world without confusing them.
39. "Goal-directed, motivated, coping, striving, purposeful action is an aspect or by-product of the necessary transactions between a psyche and non-psyche world." (7: p.213)
40. Growth theory and self-actualization theory hold that not only the past exists now in a person but that also the future exists now in the form of hopes, ideals, duties, tasks, plans, goals, unrealized potentials, mission, fate, destiny, etc.

II. IMPLICATIONS FOR EDUCATORS

A. Objectives

Maslow appears to see the role of the teacher as that of encouraging the free development of the learner toward self-actualization, or full-humanness, by providing the best educational conditions for this growth process. In the encouragement of such humanness it is necessary to consider the need to integrate both the actuality and potentiality characteristic of human nature. However, he also lists "insight, intellect in the broader sense, creativeness, play and art" (7: p.10) as integration techniques--and all of these are common educational goals, objectives, or activities.

Poor Copy

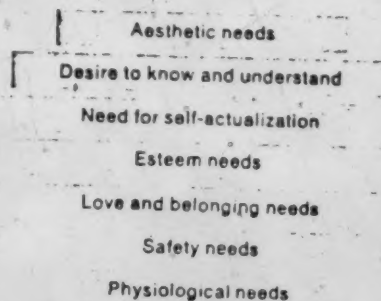
In attempting to reach the desired goal, i.e., an authentic human, Maslow warns against over-stressing existential choices or Rogerian discovering and uncovering therapy and understressing "the . . . power of autonomous social and environmental determinants (ward, poverty, social structure) (u: pp.12-13). Maslow infers that to help the growth of another human being it is necessary to understand him and that the best way to understand him "is to be able to see his world through his eyes" (7: p.14). The existential tenet of the ultimate aloneness of the individual should remind us of the need to work out further such concepts as decision, responsibility, choice, autonomy and identity as well as the further problem of communication between alonenesses. Maslow also suggests that the existentialists can help us recognize the limits of verbal, analytic rationality and the need for raw experience prior to the introduction of any concepts or abstractions.

As educators, Maslow contends that we should recognize and accept the fact that "the future is in principle unknown and unknowable, which means that all habits, defenses and coping mechanisms are doubtful and ambiguous since they are based on past experience. Only the flexibly creative person can really manage the future, only the one who can face novelty with confidence and without fear" (7: p.16). Therefore our basic, underlying objective as teachers should be to produce such people.

B. Encouragement of Growth and Motivation

Since a learner can only be consistently motivated to learn when he feels a desire, or want, or needs, or yearning, or lack, and since objectively observable states correlate insufficiently with subjective reports teachers face a major problem in recognizing their student's needs. However, if the teacher accepts as fact the tendency of people toward growth and self-perfection, then the occurrence of growth is partly indicated by positive pointing and partly by negative contract.

The implications for teaching of Maslow's theory of motivation are provocative. One down-to-earth implication is that a teacher should do everything possible to see that the lower-level needs of students are satisfied so that they will be more likely to function at the higher levels. Your students will be interested in satisfying the need to understand and know in your classes if they are physically comfortable, feel safe and relaxed, have a sense of belonging, and experience self-esteem. To help you keep this in mind, here is Maslow's list of needs arranged in a literal hierarchial form:



Poor Copy

Maslow's direct study of a large number of psychologically healthy individuals describes the end product of growth and instructs us with respect to the processes necessary for growth. He lists the following characteristics of clinically observed psychologically healthy, growing people.

1. Superior perception of reality.
2. Increased acceptance of self, of others and of nature.
3. Increased spontaneity.
4. Increase in problem-centering.
5. Increased detachment and desire for privacy.
6. Increased autonomy, and resistance to enculturation.
7. Greater freshness of appreciation, and richness of emotional reaction.
8. Higher frequency of peak experiences.
9. Increased identification with the human species.
10. Changed (the clinician would say, improved) interpersonal relations.
11. More democratic character structure.
12. Greatly increased creativeness.
13. Certain changes in the value system.

Such healthy people have sufficiently gratified their basic needs - but Maslow estimates that this accounts for less than one percent of the population. For the remainder, needs are either seen as a threat, nuisance, lack or to be enjoyed or accepted. In developing his hierarchy of needs, Maslow is attempting to tie together and interrelate a person's multiple, separate motivational episodes into a hierarchial structure which will account for an individual's growth or regression. The different basic needs are related to each other in this hierarchial order such that the removal of one need brings about the emergence into consciousness of another "higher" need (7: p.30). This relationship of needs is of great significance to teachers in that it implies that once a student has satisfied a basic need that need will no longer motivate his behavior. It also tells the teacher that self-actualizing growth is not possible until basic needs have been gratified.

It might appear, then, that an affective teaching strategy that provides for student's basic needs together with a challenging, supportive environment would result in the production of fully human graduates. But every teacher knows that even when this is done a student may either not grow or regress. Maslow suggests that unsatisfied needs have regressive and fixative power, that safety and security are attractive and that the unknown is fear inducing. He sees this as a basic existential dilemma or conflict. Healthy growth ensues "when the delights of growth and anxieties of safety are greater than the anxieties of growth and the delights of safety" (7: p.47). It is up to the teacher to make sure the former circumstances exist and to tell whether the student is ready to move ahead on the basis of his choices. "The really good teacher who espouses verbally a completely rosy and optimistic picture of human nature, will imply in actual teaching a complete understanding and respect for regressive and defensive forces." (7: p.53).

REFERENCES

1. Aspy, David. N. "Maslow and Teachers in Training." The Journal of Teacher Education, Volume xx; No. 3; Fall, 1969; pp. 303-9.
2. Hebron, M.E. Motivated Learning. Methuen & Co. Ltd., 1966
3. Lipsman, Claire K. "Maslow's Theory of Needs in Relation to Vocational Choice by Students from Lower Socio-Economic Levels." Vocational Guidance Quarterly, June, 1967, pp. 283-8.
4. Maslow, A.H. Motivation and Personality. Harper and Row, New York, 1954.
5. Maslow, A. H. Eupsychian Management. Richard D. Irwin, Inc., Homewood, Illinois, 1965.
6. Maslow, A. H. The Psychology of Science. Harper and Row, New York, 1966.
7. Maslow, A. H. Toward a Psychology of Being. D. Van Nostrand Co., Princeton, 1968.

There are four basic conditions for effective learning. Many others are important, but the four listed here are essential:

1. Class atmosphere must be warm, friendly and free from threat.

Whenever a student feels that he is rejected by you or by other students, or senses that any action or comment of his is met with only cold appraisal, his anxiety about himself and how he is getting along with others becomes a major concern. When this happens the student has little enthusiasm or energy left for dealing with the problems of learning.

2. New ways of acting should be encouraged. While it is important that the classroom provide a warm emotional climate, this should not become over-protective. Students should have opportunities for experimentation, for venturing into the unknown. This, of course, means protection from ridicule in case mistakes are made during the process of experimentation.

3. The student must gradually learn to become independent of the teacher's learning supports. It is entirely possible that a student will become overly dependent upon his teacher. For example: a student of conversational French may chatter away in class because he knows it pleases the teacher and wins his praise. Outside of class, the same student may seek no opportunities to practice his new language skill. He is motivated by a desire to please the teacher rather than a real desire to learn French.

On the other hand, it is possible for an adult student to adopt such an extreme attitude of independence toward a teacher or toward other classmates or toward school itself that most of his time and energies are occupied by psychological withdrawal - and eventual "drop out" -

as a way of rejecting the learning experience. The third condition therefore, means that for effective learning to take place a continuing and interdependent relationship must exist between the teacher and individual students.

4. Finally, for effective learning to take place, there must be effective, three-way communication - from teacher to student, from student to teacher, and from student to student.

Conditions for a good instructional situation do not just happen. Sometimes a teacher, sincerely desiring a good climate for work, mistakenly assumes that it automatically exists. You can, for example, repeatedly tell the students, "I am here to help you. Tell me any problems you may have in trying to understand our lessons." At the same time, the atmosphere may be too cold and forbidding for the student to say honestly and freely, "You talk so fast I can't remember what you say."

A teacher may be personally warm and receptive but lack the skill to help the class create unspoken rules of behavior that support free expression of opinion. One individual might want to communicate freely with his teacher but feels pressure from other members of the class not to respond unless spoken to.

You'll Need These Skills

1. The first skill to develop is that of stimulating a clear and self-evident sharing of goals. Curriculum demands from outside the classroom (such as those of a curriculum committee), the purposes of the teacher, and the goals of the students - all these need to be discussed with the students. Through group discussion and planning, these many different goals can be built into a common goal that becomes a strong and treasured possession of students and teacher alike.

2. A second skill is that of developing clear "rules of behavior" for the group. The group needs to know, for example, under what conditions it's permissible to ask a question. . . . to make an observation about the way something is being done. How are these standards set - by the teacher or by the entire class? What is the standard of the group about leadership? Do only a few individuals feel free to suggest new activities, ask for help from the teacher, suggesting new activities, or does every student have an opportunity to try being a leader? What are the rules of behavior about completing a task? As answers to these questions are developed, standards of behavior emerge. These standards should be developed gradually by you and your students working together and talking about the outcome.

3. The third skill relates to the process of student self-evaluation. In order to learn from their own experience adults must constantly evaluate their efforts, re-do work when necessary; and rebuild toward shared goals. It is your responsibility to provide opportunities for this constant evaluation.

How to Test Your Learning Conditions

How do you know whether you have created conditions for effective learning? Such conditions exist in your class or group if -

1. There is unrestricted communication.

In the early years of school, a child carried to the classroom patterns of communication he learned at home. He may have been naive and open - or withdrawn and unresponsive. However, as he progressed through life, no matter how naturally open or communicative he once was, he gradually learned how to restrain and control his communication patterns. By the time he has become an adult he has learned ways to protect himself from real or imagined attack and to display himself to best advantage.

Therefore, in some adult classes you may not get questions or comments at all when you say, "Are there any questions before I go on and read the rest of the instructions on the test?" You may mistakenly assume that the lack of response means your directions have been clear and concise and that no further explanation is necessary. Instead, the lack of response may mean that the students are afraid to speak up. As we know from our own reaction if asked, when in a large or strange group, if we have any questions, silence may reflect embarrassment or confusion rather than understanding.

On the other hand, if the atmosphere of the classroom reaches the level of permissiveness where it is safe for a student to say, "Mr. Smith, the illustrations you give are over my head" or "You said that you were going to give the directions only once and I don't think that's right", you have suddenly acquired an enormously rich fund of knowledge and insight to help you plan and prepare your work. Only as you and your students are successful in setting a picture of yourselves as seen by others can you respond adequately to the teaching and learning demands placed upon you.

2. You are not too "bossy"

If you are to set up conditions for maximum learning, it is necessary to give up some measure of control of the classroom and share this responsibility with members of the class.

To bring this about, you must bring considerable emotional and social poise into the classroom. A person who feels the need to control or dominate the lives of others may be successful in some endeavors but he is ill equipped to help others learn.

An individual - be it adult student or teacher - who constantly needs to defend or protect his own way of working and thinking has little opportunity to change and grow.

Assignments Are Motivated

Since many adult courses require students to do outside assignments, we should look at the role motivation plays here. When teachers simply tell students to read a certain number of pages or perform some other specific task, they are not motivating students to do that work. Instead, teachers should help students see how the outside assignment will help them achieve their own goals.

Naturally, this approach requires work on your part too. For you must help the students think through why they should know the subject and how and when they can use it. Only then can the student clearly define the desired learning outcomes. The assignment then given to the students should include these points:

1. the lesson objective (what he should be able to do by studying the assignment)
2. to determine why the subject is important to him
3. where to find the necessary study material
4. what he will be expected to do or know in the class period

There's Plenty of Action

Learning, as we have noted, is an active process and the action must focus primarily on the student rather than the teacher. You should, therefore, plan a variety of participating activities for the student - observing, listening, thinking, remembering, imagining, writing, answering, questioning, feeling, touching, moving, agreeing, disagreeing, and discussing. The more participation on the part of the student, the more learning will take place. Put another way, the more your students use their various senses, the more they will learn.

Individual Differences Are Recognized

If the learning process is to be a truly living process, you must recognize that individual differences exist among students. No two people learn at the same rate. A student's experience and background in a particular subject, for instance, may vary a few weeks or many years from that of another student. The teacher who recognizes these differences and plans his teaching accordingly will help each student learn as much as he is capable of learning. Here are some ways to determine individual differences:

Student discussion after a presentation by the teacher. - You may note that one student absorbed almost all the material, while another student digested only isolated bits. The discussion also may help you find out why these differences exist.

Student Records. - If your school has guidance and counselor services for adults, they will be your biggest help in detecting differences. Their records will show achievement scores and intelligence test scores. Educational achievement (in years) sometimes will be helpful, too.

Private conference. - Through this method you can get to know the students as individuals. Learning difficulties and personal problems which may be interfering with learning can be discussed. Information obtained in private conferences often can help you adjust course requirements to meet students' needs.

One way of allowing for individual differences in a group is semi-independent activity which allows a student some time to work alone and permits more individual instruction from you. Under this plan, the students meet as a group most of the time but for a part of each class or of occasional classes, they carry on alone or as parts of small groups. You can help individuals or

small groups as the need arises. Students who might hesitate to ask questions before the entire group often feel free to ask them privately or in front of a small group. Also, since students will interpret information differently, questions handled individually can be answered more effectively and will not take up the time of the class.

Bibliography - Adult Learning

- Birren, James E. The Psychology of Aging. Englewood Cliffs, N.J.: Prentice-Hall, 1964.
- Bloom, B. Stability and Change in Human Characteristics. New York: Wiley, 1964.
- Bromley, D.B. The Psychology of Human Aging. Baltimore, Md.: Penguin Books.
- Broudy, Harry S. Aims in Adult Education: A Realist View. Chicago: C.S.L.E.A., 1959. #28.
- Burns, Hobert W. Sociological Backgrounds of Adult Education. Syracuse: C.S.L.E.A., 1964. #41.
- Cotton, Webster E. On Behalf of Adult Education: A Historical Examination of the Supporting Literature. Boston: C.S.L.E.A. #56.
- Deinum, Andries. Speaking for Myself: A Humanist Approach to Adult Education for a Technical Age. Boston: C.S.L.E.A., 1966. #52.
- ERIC Clearinghouse on Adult Education. Adult Learning Characteristics. No. 21, May 1968.
- Gagne, R.M. The Conditions of Learning. New York: Holt, Rinehart & Winston.
- Gardner, John W. Self-Renewal: The Individual and the Innovative. New York: Harper, 1964.
- Havighurst, Robert J. & Orr, Betty. Adult Education and Adult Needs. Chicago: C.S.L.E.A., 1956. #
- Houle, Cyril O. Major Trends in Higher Adult Education. Chicago: C.S.L.E.A., 1959. #24.
- Houle, Cyril O. The Continuing Task: Reflections on Purpose in Higher Continuing Education. Boston: C.S.L.E.A., 1967. #54.
- Johnstone, J.W.C. et al. Volunteers for Learning. Chicago: N.O.R.C., University of Chicago, 1963.
- Kidd, J.R. How Adults Learn. New York: Association Press, 1952.
- Knowles, M.S. The Modern Practice of Adult Education: Andragogy vs. Pedagogy. New York: Association Press, 1970.
- Kuhlen, Raymond G. Psychological Backgrounds of Adult Education. Chicago: Centre for the Study of Liberal Education for Adults, 1963.

- Miller, Harry L. Teaching and Learning in Adult Education. New York: Macmillan Company, 1964.
- Murphy, Gardner and Kahlen, R. Psychological Needs of Adults. C.S.L.E.A., 1955.
- Neugarten, B. Personality in Middle and Late Life. Englewood Cliffs, N.J.: Prentice-Hall, 1964.
- Rogers, Carl R. Freedom to Learn. Columbus, Ohio: C.E. Merrill Publishing Co., 1969.
- Schutz, William C. Joy: Expanding Human Awareness. New York: Grove Press, 1967.
- Sheats, Paul H. The Case Against the Adult Learner. Boston: C.S.L.E.A., 1965.
- Solomon, Daniel. The Continuing Learner. Boston: C.S.L.E.A., 1964.
- Staton, Thomas P. How to Instruct Successfully: Modern Teaching Methods in Adult Education, New York: McGraw-Hill, 1960.
- Tough, A. Why Adults Learn. Toronto: O.I.S.E., 1968.

ADULT LEARNING BIBLIOGRAPHY

- Andrew, June M. "Coping Style and Declining Verbal Abilities", Journal of Gerontology, 1973, 28, 2, 179-183.
- Baltes, Paul B. "Strategies for Psychological Intervention in Old Age: A Symposium", The Gerontologist, 1973, 13, 4-38.
- Cappon, Daniel. "Psychiatric Problems: 2. Mental Factors in Aging", Postgrad Medicine, 1971, 49, 199-200.
- Clark, Linda E.; Knowles, John B. "Age Differences in Dichotic Listening Performance", Journal of Gerontology, 28, 2, 173-178.
- Craik, F.I.M.; Masani, P.A. "Age and Intelligence Differences in Coding and Retrieval of Word Lists", British Journal of Psychology, 1969, 60, 315-319.
- Drachman, David, A.; Hughes, John R. "Memory and the Hippocampal Complexes", Neurology, 1971, 21, 1-14.
- Kirsner, K. "Developmental Changes in Short-Term Recognition Memory", British Journal of Psychology, 1972, 63, 1, 109-117.
- Knowles, M.S. "Andragogy: An Emerging Technology for Adult Learning", The Modern Practice of Adult Education, 1970, 37-54.
- Lishman, W.A. "Selective Factors in Memory. Part 1: Age, Sex and Personality Attributes", Psychological Medicine, 1972, 2, 121-138.
- Moenster, P.A. "Learning and Memory in Relation to Age", Journal of Gerontology, 1972, 27, 3, 361-363.
- Monge, R. H. "Studies of Verbal Learning from the College Years Through Middle Age", 1971, Journal of Gerontology, 26, 3, 324-329.
- Taub, Harvey A. "A Further Study of Aging, Short-Term Memory, and Complexity of Stimulus Organization", Journal of Genetic Psychology, 1972, 120, 162-164.

ADULT LEARNING MODULE - FORM C

NAME: _____

TIME 1 HOUR

DIRECTIONS:

1. Answer all 40 questions.
2. Choose the best answer for each question.
3. Answer on this booklet and also on the machine scored sheet.
4. Keep the booklet and return the machine scored sheet.
5. Record all answers on the machine scored sheet with a soft pencil.

1. The single most important motivating factor for adult learners is:
 - a) competition
 - b) success in learning
 - c) the desire to learn new knowledge
 - d) teacher enthusiasm
2. Different ways of organizing learning materials have different effects on the adult learner's ability to retain information. Retention is improved if:
 - a) material is presented in small unrelated units
 - b) material is organized by the teacher and never organized by the learner.
 - c) new material is organized to be learned in the way it will be needed for use.
 - d) the adult learner has complete freedom to organize new material.

There are several generalizations which can be made with respect to how adults learn. The generalizations are sometimes expressed as "laws of learning". The following two questions relate to these laws of learning.

3. The more often an act is repeated the more quickly a habit is established. This statement relates to the law of:
 - a) disuse
 - b) primacy
 - c) effect
 - d) exercise
4. First impressions are important in learning new material. This statement relates to the law of:
 - a) intensity
 - b) primacy
 - c) exercise
 - d) effect
5. Adults are sometimes ineffective learners at the early stages of a new learning experience because of the problem of being:
 - a) limited in intellectual ability
 - b) disinterested in the content
 - c) afraid of failure
 - d) in conflict with other learners
6. Maslow sees the role of the teacher as that of encouraging the free development of the learner to achieve:
 - a) dependence
 - b) self-actualization
 - c) insight
 - d) reliance

7. Learning tasks need to be sequenced. In sequencing learning tasks for adult learners it is generally better to sequence instructions:
 - a) to coincide with the learner's present knowledge and previous experience
 - b) according to Maslow's need hierarchy
 - c) according to Bloom's taxonomy of cognitive objectives
 - d) to coincide with Gagné's "conditions for learning."
8. Considering the instructional tasks of managing instruction for adult learners; which statement best represents the difference between adult and younger (high school) learners.
 - a) Adults generally require more guidance than younger learners.
 - b) Younger learners generally require more feedback and encouragement than adult learners.
 - c) In motor skill learning younger learners require more guidance than adult learners.
 - d) Younger students usually avoid competitive situations (those which measure them against others) more than adult students.
9. To improve the attentional set of the adult learner the instructor:
 - a) should present interesting material even if it is non-essential
 - b) often needs to use novel or intense stimuli
 - c) should speak slowly
 - d) often needs to force the learners to take rests
10. The ability of an adult learner to "perceive" new material is directly related to the extent that this new material is:
 - a) organized
 - b) identified in earlier learning
 - c) reviewed
 - d) meaningful
11. Meaningful material generally is the easiest kind of material for the adult to learn and remember. Which kind of learning activity is best suited to the establishment of meaningfulness of new material?
 - a) partaking in group discussions
 - b) working with independent projects
 - c) listening to lectures
 - d) independently studying case studies
12. Four basic conditions are identified as being essential for creating a good climate for effective adult learning. Three of these are:
 - 1) the teacher's learning supports; 2) classroom atmosphere must be warm, friendly, and free from threat; and 3) there must be three-way communication.The fourth basic condition is:
 - a) feedback should be given to the learner only after he feels secure in the new environment.

- b) The learner must learn to communicate more with the teacher and less with fellow classmates.
 - c) new ways of acting must be encouraged.
 - d) traditional ways of acting must be encouraged.
13. The best kind of feedback for adult learners is:
- a) designed to show the individual learners how they are competing with the rest of the group.
 - b) infrequent so as not to discourage the learner.
 - c) never given at the beginning of a learning experience.
 - d) frequent and based on individual growth, not competitive status.
14. Robert M. Gagne's "Conditions for Learning" outlines a hierarchy of seven kinds of learning. Because it is a hierarchy the pre-conditions for learning:
- a) must be determined by systematic objective testing
 - b) can easily be identified by each learner for himself.
 - c) ~~must~~ be identified and met before moving to a higher level.
 - d) ~~must~~ be identified and met after the higher level of learning has been achieved.
15. R. M. Gagne states that the first kind of learning which must be mastered as a pre-requisite to all other levels of learning is:
- a) response learning
 - b) identification learning
 - c) principle learning
 - d) association learning
16. According to R. M. Gagné's "Conditions for Learning" the type of learning which is acquired when a set of objectives or events differing in physical appearance is identified as a class is called:
- a) principle learning
 - b) concept learning
 - c) response learning
 - d) identification learning
17. There can be little doubt that there is some decline in the abilities of adults to learn as they grow older. Which statement below best represents the general nature of this decline in abilities:
- a) There is a regular, highly predictable pattern to the decline of learning abilities in adults.
 - b) The decline in learning abilities of adults is so small that it can be considered irrelevant to the teacher of adults.
 - c) The same abilities decline at the same rates in different persons.
 - d) The same abilities decline at different rates in different persons.

18. In the development of the human learning capability which ability tends to reach its peak latest of all abilities:
- reasoning ability
 - verbal ability
 - manual ability
 - remembering ability
19. Miller's research pointed out years ago that the average youth's (approx. 16 years old) mental facility for remembering (coding of material) is limited to a maximum of about seven isolated facts. The general mental facility for remembering isolated facts for adults (say approx. 40 years and over) is approximately:
- above this "magical number seven".
 - equal to this "magical number seven".
 - slightly below this "magical number seven". (i.e. 4-5)
 - well below this "magical number seven". (i.e. 1-2)
20. Consider the situation where a person has forgotten some material because he learned it a long time ago and has not reviewed it for a long time. This kind of forgetting can be accounted for by the following theory of forgetting:
- motivated forgetting
 - passive decay through disuse
 - retroactive inhibition
 - proactive inhibition
21. Recognition memory involves:
- the ability to reconstruct material
 - reproducing material in complete detail
 - the short-term memory system in the remembering process
 - selecting of specific material from a large store of material
22. The intellectual ability of adults does diminish over time. The most important phenomenon of this decrement in ability that a teacher of adults should recognize is:
- a decrease in the speed at which adults can learn
 - decreased interest towards achieving goals
 - a decrease in the amount of material that the adults can ultimately learn
 - decreased ability to handle verbal material
23. Detrimental changes in an adult's ability to learn is most noticeable with material which relates to:
- problem solving
 - the development of principles
 - verbal functions
 - reasoning by analogy

24. Which statement is generally more accurate about adult learners (over thirty years old):
- a) There is a decline in the adult's ability and speed in learning.
 - b) There is no decline in an adult's ability or power to learn; but there is a decline in the speed with which an adult can learn.
 - c) There is a decline in an adult's ability (power) to learn but not a decline in the speed at which an adult can learn.
 - d) There is no decline in an adult's ability or power to learn; nor in his speed of learning.
25. To aid in the development of a "memory trace" to ensure retention of material in long-term memory, which of the following learning conditions should be employed:
- a) new material should be put to use as soon as possible
 - b) new material should be repeated many, many times
 - c) new material should not be used in a practical situation until it has time to develop into a memory trace
 - d) reinforcement of newly learned material should be postponed for at least two or three days.

Maslow's hierarchy of needs forms the foundation of his theory of motivation. The following three questions (questions 26, 27, and 28) relate to Maslow's hierarchy.

26. Which one of the following needs is the "highest" on Maslow's hierarchy:
- a) esteem needs
 - b) love and belonging needs
 - c) need for self-actualization
 - d) aesthetic needs
27. Which list of needs (starting at lowest level; going to highest level) is most representative of Maslow's hierarchy:
- a) physiological needs; safety needs; love and belonging needs; esteem needs
 - b) physiological needs; esteem needs; love and belonging needs; safety needs
 - c) esteem needs; love and belonging needs; safety needs; physiological needs
 - d) love and belonging needs; safety needs; physiological needs; esteem needs
28. The good teacher of adults should assist the learner moving from one hierarchical level to another by:
- a) administering psychological testing
 - b) using subjective choice (teacher)
 - c) allowing the group to make the choice
 - d) allowing the individual to make his own choice

29. A decline in one's learning ability can be observed to occur starting at approximately age twenty-five to thirty years. This can generally be attributed to:
- a) physiological changes
 - b) changes in one's mental ability
 - c) changes in motivation
 - d) emotional changes
30. One of the most noted changes in an adult's ability to learn is the decline in the ability to:
- a) remember vocabulary
 - b) remember verbal material
 - c) remember isolated facts
 - d) remember related facts
31. Which one of the following statements best represents the activity most useful in helping to retard the deterioration of intellectual processes with age:
- a) exercising the mind by memorizing poetry or like tasks
 - b) exercising the mind by working with mathematical computations
 - c) resting the mind
 - d) exercising the mind with creative imaginative tasks
32. Generally the best time to learn specific objectives is:
- a) immediately before they are required for use
 - b) immediately after learning something very similar in nature
 - c) early in the day before one becomes too tired
 - d) a significantly long time before the information will be used
33. Which of the following statements best describes the differences between recognition and recall memory processes:
- a) recognition memory works best for young people; and recall memory works best for adults
 - b) recognition memory has a greater capacity than does recall memory
 - c) recall memory has a greater capacity than does recognition memory
 - d) there is generally no difference in the capacity between recall memory and recognition memory
34. Content which is meaningful to the adult learner is remembered longer. Which learning environment would be best suited to the establishment of meaningfulness of new material:
- a) listening to a lecture
 - b) partaking in self-directed reading
 - c) working with computer assisted learning packages
 - d) partaking in a group discussion

35. Consider the situation where a person has difficulty remembering new material because of confusion with something previously learned. This is an example of which one of the following theories of forgetting:
- a) retroactive and proactive inhibition
 - b) motivated forgetting
 - c) systematic distortions of the memory trace
 - d) passive decay through disuse
36. Perhaps the best measure of how well something has been remembered is to measure:
- a) the rate of forgetting by repetitive testing
 - b) the rate at which practice was employed during the original learning
 - c) the rate of relearning required to get the original level
 - d) the rate at which the original learning took place
37. Robert M. Gagné's "Conditions for Learning" has as the highest level on the hierarchy the following kind of learning:
- a) problem solving
 - b) concept learning
 - c) learning of associations
 - d) principle learning
38. Great care needs to be taken in the selection of content for adult education programs. The richest source of content for adults programs is attained:
- a) when an expert prepares and teaches the course
 - b) when a group of experts select the content
 - c) by combining the knowledge of the learners in the class with that of the expert
 - d) by having the learners select the content
39. Which of the following statements is generally more true with respect to the difference between adult learners and young learners (high school age):
- a) young learners tend to be more rigid in their thinking than adult learners
 - b) adults are generally less impatient than young learners in the pursuit of learning objectives
 - c) adults are more insistent on active participation than young people
 - d) young people are more insistent on active participation than adult learners
40. Which of the following statements is generally more true with respect to the difference between adult learners and high school age learners:
- a) adults are generally less afraid of failure at the beginning of a new learning task than younger learners
 - b) young learners are more easily affected by environmental conditions (i.e. light, noise, etc.) than adult learners

- c) adult groups are generally more homogeneous (similar) than young groups
- d) adult groups are generally more heterogeneous (different) than young groups

Answers to:

ADULT LEARNING - FORM C.

<u>Question #</u>	<u>Ans.</u>	<u>Question #</u>	<u>Ans.</u>
1	B	21	D
2	C	22	A
3	D	23	D
4	B	24	B
5	C	25	A
6	B	26	D
7	A	27	A
8	A	28	D
9	B	29	A
10	D	30	C
11	A	31	D
12	C	32	A
13	D	33	B
14	C	34	D
15	A	35	A
16	B	36	C
17	D	37	A
18	A	38	C
19	C	39	C
20	B	40	D

ADULT LEARNING - FORM D

Name: _____

TIME: 1 HOUR

Directions:

1. Answer all 40 questions.
2. Choose the best answer for each question.
3. Answer on this booklet and also on the machine scored sheet.
4. Keep the booklet and return the machine scored sheet.
5. Record all answers on the machine scored sheet with a soft pencil.

1. The single most important motivating factor for adult learners is:
 - a) competition
 - b) success in learning
 - c) the desire to learn new knowledge
 - d) teacher enthusiasm
2. Different ways of organizing learning materials have different effects on the adult learner's ability to retain information. Retention is improved if:
 - a) material is presented in small unrelated units
 - b) material is organized by the teacher and never organized by the learner
 - c) new material is organized to be learned in the way it will be needed for use
 - d) the adult learner has complete freedom to organize new material

There are several generalizations which can be made with respect to how adults learn. The generalizations are sometimes expressed as "laws of learning". The following two questions relate to these laws of learning.

3. The more often an act is repeated the more quickly a habit is established. This statement relates to the law of:
 - a) disuse
 - b) primacy
 - c) effect
 - d) exercise
4. First impressions are important in learning new material. This statement relates to the law of:
 - a) intensity
 - b) primacy
 - c) exercise
 - d) effect
5. Adults are sometimes ineffective learners at the early stages of a new learning experience because of the problem of being:
 - a) limited in intellectual ability
 - b) disinterested in the content
 - c) afraid of failure
 - d) in conflict with other learners
6. Maslow sees the role of the teacher as that of encouraging the free development of the learner to achieve:
 - a) dependence
 - b) self-actualization
 - c) insight
 - d) reliance

7. Learning tasks need to be sequenced. In sequencing learning tasks for adult learners it is generally better to sequence instructions:
 - a) to coincide with the learner's present knowledge and previous experience
 - b) according to Maslow's need hierarchy
 - c) according to Bloom's taxonomy of cognitive objectives
 - d) to coincide with Gagné's "conditions for learning."
8. Considering the instructional tasks of managing instruction for adult learners; which statement best represents the difference between adult and younger (high school) learners:
 - a) adults generally require more guidance than younger learners
 - b) younger learners generally require more feedback and encouragement than adult learners
 - c) in motor skill learning younger learners require more guidance than adult learners
 - d) younger students usually avoid competitive situations (those which measure them against others) more than adult students
9. To improve the attentional set of the adult learner the instructor:
 - a) should present interesting material even if it is non-essential
 - b) often needs to use novel or intense stimuli
 - c) should speak slowly
 - d) often needs to force the learners to take rests
10. The ability of an adult learner to "perceive" new material is directly related to the extent that this new material is:
 - a) organized
 - b) identified in earlier learning
 - c) reviewed
 - d) meaningful
11. Meaningful material generally is the easiest kind of material for the adult to learn and remember. Which kind of learning activity is best suited to the establishment of meaningfulness of new material?
 - a) partaking in group discussions
 - b) working with independent projects
 - c) listening to lectures
 - d) independently studying case studies
12. Four basic conditions are identified as being essential for creating a good climate for effective adult learning. Three of these are: 1) the teacher's learning supports; 2) classroom atmosphere must be warm, friendly, and free from threat; and 3) there must be three-way communication. The fourth basic condition is:
 - a) feedback should be given to the learner only after he feels secure in the new environment
 - b) the learner must learn to communicate more with the teacher and less with fellow classmates
 - c) new ways of acting must be encouraged
 - d) traditional ways of acting must be encouraged

13. The best kind of feedback for adult learners is:
- a) designed to show the individual learners how they are competing with the rest of the group
 - b) infrequent so as not to discourage the learner
 - c) never given at the beginning of a learning experience
 - d) frequent and based on individual growth, not competitive status
14. Robert M. Gagne's "Conditions for Learning" outlines a hierarchy of seven kinds of learning. Because it is a hierarchy the pre-conditions for learning:
- a) must be determined by systematic objective testing
 - b) can easily be identified by each learner for himself
 - c) must be identified and met before moving to a higher level
 - d) must be identified and met after the higher level of learning has been achieved
15. R. M. Gagne states that the first kind of learning which must be mastered as a pre-requisite to all other levels of learning is:
- a) response learning
 - b) identification learning
 - c) principle learning
 - d) association learning
16. According to R. M. Gagne's "Conditions for Learning" the type of learning which is acquired when a set of objectives or events differing in physical appearance is identified as a class is called:
- a) principle learning
 - b) concept learning
 - c) response learning
 - d) identification learning
17. There can be little doubt that there is some decline in the abilities of adults to learn as they grow older. Which statement below best represents the general nature of this decline in abilities:
- a) there is a regular, highly predictable pattern to the decline of learning abilities in adults
 - b) the decline in learning abilities of adults is so small that it can be considered irrelevant to the teacher of adults
 - c) the same abilities decline at the same rates in different persons
 - d) the same abilities decline at different rates in different persons
18. In the development of the human learning capability which ability tends to reach its peak latest of all abilities:
- a) reasoning ability
 - b) verbal ability
 - c) manual ability
 - d) remembering ability

19. Miller's research pointed out years ago that the average youth's (approx. 16 years old) mental facility for remembering (coding of material) is limited to a maximum of about seven isolated facts. The general mental facility for remembering isolated facts for adults (say approx. 40 years and over) is approximately:
- a) above this "magical number seven".
 - b) equal to this "magical number seven".
 - c) slightly below this "magical number seven". (i.e. 4-5)
 - d) well below this "magical number seven". (i.e. 1-2)
20. Consider the situation where a person has forgotten some material because he learned it a long time ago and has not reviewed it for a long time. This kind of forgetting can be accounted for by the following theory of forgetting:
- a) motivated forgetting
 - b) passive decay through disuse
 - c) retroactive inhibition
 - d) proactive inhibition
21. Recognition memory involves:
- a) the ability to reconstruct material
 - b) reproducing material in complete detail
 - c) the short-term memory system in the remembering process
 - d) selecting of specific material from a large store of material
22. The intellectual ability of adults does diminish over time. The most important phenomenon of this decrement in ability that a teacher of adults should recognize is:
- a) a decrease in the speed at which adults can learn
 - b) decreased interest towards achieving goals
 - c) a decrease in the amount of material that the adults can ultimately learn
 - d) decreased ability to handle verbal material
23. Detrimental changes in an adult's ability to learn is most noticeable with material which relates to:
- a) problem solving
 - b) the development of principles
 - c) verbal functions
 - d) reasoning by analogy
24. Which statement is generally more accurate about adult learners (over thirty years old):
- a) there is a decline in the adult's ability and speed in learning
 - b) there is no decline in an adult's ability or power to learn; but there is a decline in the speed with which an adult can learn
 - c) there is a decline in an adult's ability (power) to learn but not a decline in the speed at which an adult can learn
 - d) there is no decline in an adult's ability or power to learn; nor in his speed of learning

25. To aid in the development of a "memory trace" to ensure retention of material in long-term memory, which of the following learning conditions should be employed:
- a) new material should be put to use as soon as possible
 - b) new material should be repeated many, many times
 - c) new material should not be used in a practical situation until it has time to develop into a memory trace
 - d) reinforcement of newly learned material should be postponed for at least two or three days.

Maslow's hierarchy of needs forms the foundation of his theory of motivation. The following three questions (questions 26, 27 and 28) relate to Maslow's hierarchy.

26. Which one of the following needs is the "highest" on Maslow's hierarchy:
- a) esteem needs
 - b) love and belonging needs
 - c) need for self-actualization
 - d) aesthetic needs
27. Which list of needs (starting at lowest level; going to highest level) is most representative of Maslow's hierarchy:
- a) physiological needs; safety needs; love and belonging needs; esteem needs
 - b) physiological needs; esteem needs; love and belonging needs; safety needs
 - c) esteem needs; love and belonging needs; safety needs; physiological needs
 - d) love and belonging needs; safety needs; physiological needs; esteem needs
28. The good teacher of adults should assist the learner moving from one hierarchical level to another by:
- a) administering psychological testing
 - b) using subjective choice (teacher)
 - c) allowing the group to make the choice
 - d) allowing the individual to make his own choice
29. A decline in one's learning ability can be observed to occur starting at approximately age twenty-five to thirty years. This can generally be attributed to:
- a) physiological changes
 - b) changes in one's mental ability
 - c) changes in motivation
 - d) emotional changes
30. One of the most noted changes in an adult's ability to learn is the decline in the ability to:
- a) remember vocabulary
 - b) remember verbal material
 - c) remember isolated facts
 - d) remember related facts

31. Which one of the following statements best represents the activity most useful in helping to retard the deterioration of Intellectual processes with age:
- a) exercising the mind by memorizing poetry or like tasks
 - b) exercising the mind by working with mathematical computations
 - c) resting the mind
 - d) exercising the mind with creative imaginative tasks
32. Generally the best time to learn specific objectives is:
- a) immediately before they are required for use
 - b) immediately after learning something very similar in nature
 - c) early in the day before one becomes too tired
 - d) a significantly long time before the information will be used
33. Which of the following statements best describes the differences between recognition and recall memory processes:
- a) recognition memory works best for young people; and recall memory works best for adults
 - b) recognition memory has a greater capacity than does recall memory
 - c) recall memory has a greater capacity than does recognition memory
 - d) there is generally no difference in the capacity between recall memory and recognition memory
34. Content which is meaningful to the adult learner is remembered longer. Which learning environment would be best suited to the establishment of meaningfulness of new material:
- a) listening to a lecture
 - b) partaking in self-directed reading
 - c) working with computer assisted learning packages
 - d) partaking in a group discussion
35. Consider the situation where a person has difficulty remembering new material because of confusion with something previously learned. This is an example of which one of the following theories of forgetting:
- a) retroactive and proactive inhibition
 - b) motivated forgetting
 - c) systematic distortions of the memory trace
 - d) passive decay through disuse
36. Perhaps the best measure of how well something has been remembered is to measure:
- a) the rate of forgetting by repetitive testing
 - b) the rate at which practice was employed during the original learning
 - c) the rate of relearning required to get the original level
 - d) the rate at which the original learning took place

37. Robert M. Gagné's "Conditions for Learning" has as the highest level on the hierarchy the following kind of learning:
- a) problem solving
 - b) concept learning
 - c) learning of associations
 - d) principle learning
38. Great care needs to be taken in the selection of content for adult education programs. The richest source of content for adults programs is attained:
- a) when an expert prepares and teaches the course
 - b) when a group of experts select the content
 - c) by combining the knowledge of the learners in the class with that of the expert
 - d) by having the learners select the content
39. Which of the following statements is generally more true with respect to the difference between adult learners and young learners (high school age):
- a) young learners tend to be more rigid in their thinking than adult learners
 - b) adults are generally less impatient than young learners in the pursuit of learning objectives
 - c) adults are more insistent on active participation than young people
 - d) young people are more insistent on active participation than adult learners
40. Which of the following statements is generally more true with respect to the difference between adult learners and high school age learners:
- a) adults are generally less afraid of failure at the beginning of a new learning task than younger learners
 - b) young learners are more easily affected by environmental conditions (i.e. light, noise, etc.) than adult learners
 - c) adult groups are generally more homogeneous (similar) than young groups
 - d) adult groups are generally more heterogeneous (different) than young groups

APPENDIX B
PSYCHOMOTOR LEARNING MODULE

Module #5 - Principles of Skill LearningCurriculum Objectives:

- A) Each learner will be able to identify the essential situations about how people learn skills.
- B) Each learner will be able to apply the knowledges described in A (above)
 - a) simulated learning environments
 - b) actual learning environments

Instructional Objectives:

- I Each learner will identify the "nature of skills" in civilized man as demonstrated by being able to:
 - a) name the three essential features of skilled performance
 - b) develop a model of human performance which:
 - i) identifies the stage where perception occurs
 - ii) identifies the stage where executive routines are developed
 - iii) distinguish between "formulation of output routines" and "observable performance".
 - iv) identifies and distinguishes the difference between "intrinsic" and "extrinsic" feedback.
 - v) aids in describing at least four possible kinds of observable behavior (output) that could occur for every instance of input.
- II Each learner will develop a taxonomy of psychomotor objectives being able to list each of the five main headings. In addition, each learner will demonstrate his/her understanding of the relationships inherent in the hierarchical structure of the taxonomy by being able to:
 - a) demonstrate by describing classroom examples typical observable behavior exhibited by a learner for each of:
 - i) "early"
 - ii) "associative"
 - iii) "autonomous" phases of skill learning
 - b) describe how "stimulus generalization" enters into the development of skill learning.

- c) draw a simple graph of the rates of development of a skill showing how each of the "phases" tend to exhibit a plateau in learning.
- d) draw a simple graph which helps define the "realistic limits" of a skill and accounts for individual learning differences.

III Each learner will demonstrate his/her knowledge of the interrelationships between motivation and performance by being able to:

- a) define the following:
 - i) hypothesis of par
 - ii) stress
 - iii) alertness
 - iv) fatigue
- b) name three functions of extrinsic feedback
- c) draw a single graph depicting the effect upon performance of i) low, ii) high and iii) ambient stress
- d) describe at least one learning situation where the principles relative to a "vigilance task" are observable.
- e) describe at least one learning situation where the principles relative to a "tracking task" are observable.

IV Each learner will be able to identify, describe, and discuss the different approaches to the "analysis of tasks" of motor skills. The following four approaches should be analyzed.

- a) component processes and performance capacities analysis
- b) continuums for skill analysis
- c) factor structure analysis
- d) information-processing analysis

V Each learner will be able to describe the essential relationships between speed and accuracy components of a skill by being able to:

- a) define "reaction time"
- b) explain how temporal uncertainty effects simple reaction time
- c) define type "a", "b", and "c" reaction times and describe how they interrelate to explain the features of "choice" reaction time
- d) discuss in a seminar the "speed accuracy trade-off phenomena"

VI Each learner will be able to:

- a) select from several choices specific learning activities which best facilitate learning for each of the three phases of skill learning
- b) describe two generalizations relative to massed and distributed practice in learning a skill
- c) describe two generalizations relative to whole-part practice in learning a skill
- d) describe several general procedures of instruction for the teaching of motor skills.

Assigned Reading References

PSYCHOMOTOR LEARNING MODULE

- 5R1 Lawther, John D. "Methods in Early Stages of Skill Learning"; The Learning of Physical Skills. Prentice-Hall, 1968, 50-65.
- 5R2 "Motor Learning at Advanced Skill Levels"; The Learning of Physical Skills. Prentice-Hall, 1968, 67-81.
- 5R3 Marteniuk, Ronald G. and Wenger, Howard A. "Facilitation of Pursuit Rotor Learning by Induced Stress"; Perceptual and Motor Skills, 1970, 31, 471-477.
- 5R4 Mackworth, Jane F. "The Nature of the Vigilance Task"; Vigilance and Habituation. Penguin Books, 1969, 1 - 29.
- 5R5 "Other Tasks Showing Temporal Decrement"; Vigilance and Habituation. Penguin Books, 1969, 30 - 45.
- 5R6 Stallings, L.M. "Analysis of Motor Skills"; Motor Skills - Development and Learning. Wm. C. Brown & Co., 1973, 103 - 117.
- 5R7 Fitts, P.M. and Posner, M.I. Human Performance. Brooks/Cole Publishing Co., 1969, 93 - 123.
- 5R8 Bell, James. "Do You Violate Skill-Building Principles?"; Business Education Forum, Vol. 26, 1971-72, 17-18.
- 5R9 Bell, Virginia L. Sensormotor Learning: for Research and Teaching. Goodyear Publishing Co., 1970, 73 - 91.
- 5R10 Cratty, B.J. Movement Behavior and Motor Learning. Lea and Faber, 1964, 252-265.
- 5R11 Manuel, D.W. Psychomotor Domain - A Summary. Unpublished Paper, University of Alberta, 1972, 1 - 3.

PSYCHOMOTOR LEARNING BIBLIOGRAPHY

- Arzbaecher, R.C. "In-House Engineering Training for Hospital Staff"; Journal of Medical Education, 1971, 46, 204-210.
- Bahrack, H.P. & Noble, M. "On Stimulus and Response Discriminability"; Journal of Experimental Psychology, 1961, 61, 449-454.
- Bell, J. "Do You Violate Skill-Building Principles?" Business Education Forum, 1971-72, 26, 17.
- Brainard, R.W., Irby, T.S., Fitts, P.M., & Alluisi, E.A. "Some Variables Influencing the Rate of Gain of Information"; Journal of Experimental Psychology, 1962, 63, 105-110.
- Briggs, G.E. & Brogden, W.J. "The Effect of Component Practice on Performance of a Lever-Positioning Skill"; Journal of Experimental Psychology, 1954, 48, 375-380.
- Brown, I.D. & Poulton, E.C. "Measuring the Spare 'Mental Capacity' of Car Drivers by a Subsidiary Task"; Ergonomics, 1959-61, 3-4, 35-40.
- Buffa, E.S. & Lyman, J. "The Additivity of the Times for Human Motor Response Elements in a Simulated Industrial Assembly Task"; Journal of Applied Psychology, 1958, 42, 379-383.
- Chernikoff, R., Birmingham, H.P., & Taylor, F.V. "A Comparison of Pursuit and Compensatory Tracking Under Conditions of Aiding and No Aiding"; Journal of Experimental Psychology, 1955, 49, 55-59.
- Conklin, J.E. "Effect of Control Lag on Performance in a Tracking Task"; Journal of Experimental Psychology, 1957, 53, 261-268.
- Conklin, J.E. "Linearity of the Tracking Performance Function"; Perceptual and Motor Skills, 1959, 9, 387-391.
- Crossman, E.R.F.W. "The Information-Capacity of the Human Motor-System in Pursuit Tracking"; Quarterly Journal of Experimental Psychology, 1960, 12, 1-16.
- Dunham, P. Jr. "Effects of Serial Versus Sequence Practice on Performance Level"; Perceptual and Motor Skills, 1969, 29, 554.
- Eysenck, H.J. "A New Theory of Post-Rest Upswing or 'Warm-Up' in Motor Learning"; Perceptual and Motor Skills, 1969, 28, 992-994.
- Fitts, P.M. "The Information Capacity of the Human Motor System in Controlling the Amplitude of Movement"; Journal of Experimental Psychology, 1954, 47, 381-391.

- Fitts, P.M. & Peterson, J.R. "Information Capacity of Discrete Motor Responses"; Journal of Experimental Psychology, 1964, 67, 103-112.
- Fitts, P.M. & Peterson, J.R. "Information Capacity of Discrete Motor Responses"; Journal of Experimental Psychology, 1964, 103-112.
- Fitts, P.M., Peterson, J.R. & Wolpe, G. "Cognitive Aspects of Information Processing: II. Adjustments to Stimulus Redundancy"; Journal of Experimental Psychology, 1963, 65, 423-432.
- Fitts, P.M. & Seeger, C.M. "S-R Compatibility: Spatial Characteristics of Stimulus and Response Codes"; Journal of Experimental Psychology, 1953, 46, 199-210.
- Fitts, P.M. & Switzer, G. "Cognitive Aspects of Information Processing: I. The Familiarity of S-R Sets and Subsets"; Journal of Experimental Psychology, 1962, 63, 321-329.
- Harris, S.J. & Smith, K.U. "Dimensional Analysis of Motion: VII. Extent and Direction of Manipulative Movements as Factors in Defining Motions"; Journal of Applied Psychology, 1954, 38, 126-130.
- Herman, L.M. & Bailey, D.R. "Comparative Effects of Retroactive and Proactive Interference in Motor Short-Term Memory"; Journal of Experimental Psychology, 1970, 86, 407-415.
- Klemmer, E.T. "General Theoretical Considerations"; Human Factors, 1962, 4, 75-79.
- Mackworth, J.F. "Performance Decrement in Vigilance, Threshold, and High-Speed Perceptual Motor Tasks"; Canadian Journal of Psychology, 1964, 18, 209-223.
- Mansell, J. "Plowden in the Technical College"; Technical Education and Industrial Training, 1968, 10, 326-327.
- Mansell, J. "Feedback"; Technical Education and Industrial Training, 1969, 11, 25-27.
- Mansell, J. "Methods in Technical Teaching - 3"; Technical Education and Industrial Training, 1969, 11, 54-55.
- Mansell, J. "Methods in Technical Teaching - 4"; Technical Education and Industrial Training, 1969, 11, 110-111.
- Mansell, J. "Teaching Methods in Further Education - 6"; Technical Education and Industrial Training, 1969, 11, 190-191.
- Mansell, J. "Teaching Methods in Technical Education - 5 - Progressive Teaching"; Technical Education and Industrial Training, 1969, 11, 156-157 & 164.

- Marteniuk, R.G. "Differential Effects of Shock Arousal on Motor Performance"; Perceptual and Motor Skills, 1969, 29, 443-447.
- Marteniuk, R.G. & Wenger, H.A. "Facilitation of Pursuit Rotor Learning by Induced Stress"; Perceptual and Motor Skills, 1970, 31, 471-477.
- Mordock, J.B. "Effect of Stress on Perceptual-Motor Functioning of Adolescents with Learning Difficulties"; Perceptual and Motor Skills, 1969, 29, 883-886.
- Murray, C. "Motor Performance, Size and the Dyadic System"; Perceptual and Motor Skills, 1969, 29, 531-534.
- Nissen, H.W., Chow, K.L., & Semmes, J. "Effects of Restricted Opportunity for Tactile, Kinesthetic, and Manipulative Experience on the Behavior of a Chimpanzee"; American Journal of Psychology, 1951.
- Neisser, U., Novick, R., & Lazar, R. "Searching for Ten Targets Simultaneously"; Perceptual and Motor Skills, 1963, 17, 955-961.
- Ross, S.A. "Effects of an Intensive Motor Skills Training Program on Young Educable Mentally Retarded Children"; American Journal of Mental Deficiency, 1968-69, 73, 920-926.
- Russin, R. & Teft, L.W. "Effects of Levels of Motor Activity on Visual Thresholds for Activity-Related Words and Pictographs"; Perceptual and Motor Skills, 1971, 33, 699-702.
- Wyrick, W. "Experience, Skill, Expressed Fear, and Emotional Reaction to Motor Skills Performed Under Conditions of Height"; Journal of Experimental Education, 1970, 39, 91-95.
- Voloudakis, E. "Industrial Training Techniques Applicable to the Classroom"; Business Education Forum, 1971-72, 26, 8-9.

Psychomotor Learning - Form A

Name: _____

Time: 1 Hour

Directions:

1. Answer all 45 questions.
2. Choose the best answer for each question.
3. All answers are to be recorded on the answer sheet with a soft pencil.
4. Please do not write on this question booklet.
5. Please return both the question booklet and answer sheet.
6. Be sure your name is on the answer sheet and on this page of the question booklet.
7. Thank you.

1. Generally for most motor learning tasks, individuals set some standard of excellence for themselves and are content to meet but do not strive to exceed this standard. This standard is typically:

- a) below the level of performance they are actually capable of achieving
- b) above the level of performance they are actually capable of achieving
- c) exactly at the level of performance they are actually capable of achieving
- d) changing all the time

2. In learning a skill a learner is subjected to some forms of stress (ie: demand placed on him by the tasks). Which statement best describes how stress effects the learning rate of a learner:

- a) intermittent stress generally is most effective in increasing rates of learning
- b) constant high levels of stress generally are most effective in increasing rates of learning
- c) intermittent stress usually causes decreased rates of learning as compared to constant levels of stress
- d) constant low levels of stress are generally most effective in increasing rates of learning.

3. Consider the following two types of reaction situations:

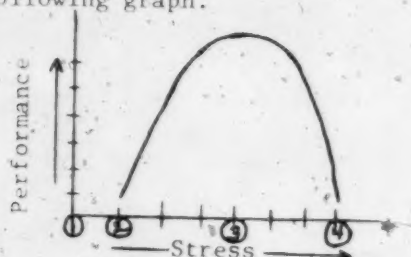
"type 1" a number of stimuli for one of which R is the required response - S -
S - R
S -
S -

"type 2" any one of a number of stimuli with its own response -
S1 → R1 or S2 → R2 or S3 → R3.

Which of the following statements would be true with respect to these two types of reaction situations:

- a) reaction times cannot be measured and compared for these two types of reaction situations
- b) there is no difference in the reaction times for these two types of reaction situations
- c) "type 2" would have a longer reaction time than "type 1".
- d) "type 1" would have a longer reaction time than "type 2".

4. Examine the following graph.



Which place on the stress scale (identified by numbers) represents the level of stress normally identified as the "ambient level of stress".

- (1)
 - (2)
 - (3)
 - (4)
5. A practical skill situation where "temporal uncertainty" is zero or at least very, very close to zero (reaction times also are almost zero) is witnessed in the case of which of the following skills:
- playing tennis well
 - operating a lathe well
 - playing music well
 - driving an automobile well
6. Which of the following types of reaction situations would normally exhibit the shortest reaction time:
- a stimulus with many chained responses - $S \rightarrow R \rightarrow R \rightarrow R \rightarrow R$
 - simple reaction time- $S - R$
 - any one of a number of stimuli with each having its own response - $S1 \rightarrow R1$ or $S2 \rightarrow R2$ or $S3 \rightarrow R3$.
 - a number of stimuli of which only one has R as the appropriate response -

S -
S - R
S -
S -

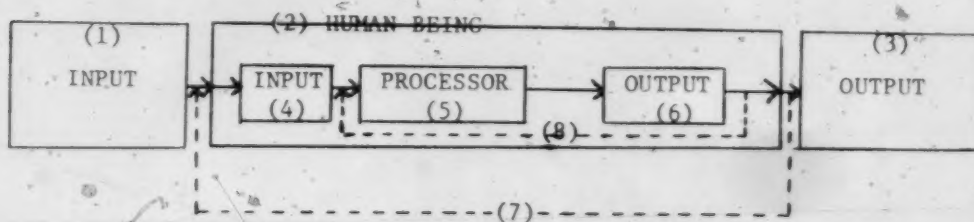
7. If a learner was attempting to master a skill and was rated as performing at the "associative phase" of learning, his general observable behavior would be something like:
- a) the learner is performing very slow, performs in short steps, and makes many errors
 - b) the learner appears to be trying to imitate the instructor and also makes many errors
 - c) the learner is working reasonably fast and is making only a very few errors but his performance is interrupted easily by someone watching or attempting to talk to him
 - d) the learner is working fast and is making only a very few errors and is at the same time discussing an upcoming fishing trip with another person
8. D. W. Manuel's taxonomy of psychomotor objectives would have as the highest level (last phase) the following heading:
- a) set
 - b) perception
 - c) autonomous
 - d) associative
9. The level or phase in D. W. Manuel's five level taxonomy of psychomotor objectives where the learner becomes prepared (establishes a "set") to begin to perform a skill is:
- a) level five
 - b) level two
 - c) level one
 - d) level three
10. Instructions given to a learner after he has performed a task should be:
- a) primarily concerned with describing the principles of the task
 - b) concerned with giving the learner knowledge of his success or failure
 - c) designed to increase stress in the learner
 - d) primarily concerned with getting the learner to relax

11. An improvement in performance in motor skill behavior may sometimes be observed even though the learner has not practiced since the last time his performance was measured. This could be accounted for by the fact that:
- a rest interval helps improve performance
 - the learner may have practiced "mentally"
 - the learner's motivation may have changed
 - all the above are true

Examine the model which is presented here. This is a "model of human performance" depicting the general makeup of the human processor of information and showing where the information is processed.

Refer to this model for questions 12 to 17 inclusive.

Answer these questions by identifying the places depicted on the model by the numbers 1 through 8.



A Model Of Human Performance

12. If a learner had hearing or sight disabilities, where on the model of human performance could this problem be explained:
- 7
 - 8
 - 1
 - 4
13. What area on the model of human performance would help explain learning difficulties due to the instructor's cultural background being different from that of the learners:
- 4
 - 5
 - 6
 - 7

14. Where on the model of human performance would a person's "poor attitude" probably cause inappropriate performance:

- a) 1
- b) 3
- c) 6
- d) 8

15. If you had asked a learner to try to perform a certain skill and the learner did not make an attempt to do so, one of the reasons could be that he did not "perceive" what you were asking him to do. What area on the model of human performance should perception have taken place:

- a) 1
- b) 3
- c) 4
- d) 7

16. Where on the model of human performance can behavior be observed by another person:

- a) 1
- b) 3
- c) 6
- d) 5

17. Where on the model of human performance could feedback be provided to the learner by way of video tape playback techniques:

- a) 5
- b) 6
- c) 7
- d) 8

18. The question often arises as to what extent learners should be forced to adopt certain forms (ie: certain posture, grips, etc.) which are considered the "best" forms. At what level in learning would it be generally accepted that individual learners should be given considerable leeway in form adjustments:
- a) early phase
 - b) pre-performance phase
 - c) associative phase
 - d) final or autonomous phase
19. When a learner is required to make adjustments to controls in response to irregular movements in the stimulus pattern he is engaging in a:
- a) decrement task
 - b) ambient task
 - c) tracking task
 - d) vigilance task
20. Loss of alertness occurs more often than fatigue when a person is functioning in a work (or learning) situation which is classified as:
- a) an open-ended task
 - b) a closed task
 - c) a tracking task
 - d) a vigilance task
21. Skilled performance is classified as such only when the situation (learner and task) exhibits the presence of three essential features. Two of these features are: 1) the presence of feedback, and 2) the presence of an organized sequence of movements. The third essential feature is:
- a) the presence of a certain level of speed
 - b) the presence of a certain level of accuracy
 - c) the presence of a purpose (being "goal" directed)
 - d) the presence of stress.

22. An increase in the intensity of stimuli will generally:
- a) cause simple reaction times to decrease
 - b) cause simple reaction times to increase
 - c) will not cause any change in simple reaction times
 - d) will result in more difficult choices between responses
23. Which one of the following statements is generally true with respect to the average person who is "mastering" a motor skill (one who has achieved a high level of performance):
- a) he does not fatigue easily
 - b) he is concentrating on eliminating errors
 - c) he makes many "extra" movements
 - d) he is very conscious of each movement he makes
24. Verbal instructions to a learner have the greatest use (amount of effect) in helping the learner develop a motor skill:
- a) at the first actual time the learner attempts to perform the skill
 - b) at one of the pre-performance stages
 - c) at the stage where the learner has developed a high level of skill
 - d) when the learner requires feedback to help eliminate errors or bad habits that have developed
25. An instructional method which combines the use of verbal instructions and manual guidance will work best:
- a) before incorrect habits are formed (early stages of development)
 - b) in the final phase of skill development
 - c) for correcting bad habits
 - d) is used continuously to the exclusion of other instructional methods

26. Very early in the development of a skill "stimulus generalization" plays an important role. Stimulus generalization is depicted in the following diagram:

a) $S \rightarrow R$

b) $S \rightarrow \begin{matrix} R \\ R \end{matrix}$

c) $\begin{matrix} S \\ \text{or} \\ S \end{matrix} \rightarrow R$

d) $S \rightarrow R \rightarrow R \rightarrow R$

27. A worker watching an automatic production system in a factory will experience long periods of low stress (he will have little to do). This type of situation usually results in:

- a) increased alertness
- b) decreased alertness
- c) increased fatigue
- d) decreased fatigue

28. In general, the most accurate type of sensory input when learning a motor skill is:

- a) verbal description (someone telling the learner what his performance looked like)
- b) visual inspection (viewing the results of one's own movements)
- c) manual guidance (someone guiding the learner's hand)
- d) kinesthetic feedback (paying attention to one's own muscular feelings)

29. Which approach to the "analysis of skills" has as the variables to measure a list similar to: rate of movement, numerical facility, psychomotor speed, perceptual speed, visualization, and others:

- a) information - processing analysis
- b) continuums analysis
- c) factor structure analysis
- d) component process analysis

30. One way to analyze skills is on the basis of various continuums. One such continuum has at the one end the suggestion that some skills are continuous (ie: riding a bicycle). The opposite end of this continuum would best be represented by the term:

- a) discrete
- b) coherent
- c) non-coherent
- d) broken

31. Every skill can be analyzed with respect to the load placed upon various component functions. There are four component functions: 1) sensory, 2) perceptual, 3) memory, and 4) responses. Which of these four component functions relates to: - pattern recognition, selective attention, and rate of search for stimuli:

- a) sensory
- b) perceptual
- c) memory
- d) response

32. Motivation and knowledge are provided to a learner through extrinsic (external to the individual) feedback. A third generally accepted function of extrinsic feedback is to provide:

- a) a source of stimuli
- b) a source of rewards
- c) stress
- d) reinforcement

33. Consider the following statement.

"A learner has been practicing a skill for some time and is at the stage where he is beginning to gain more speed after a period of practice which resulted in relatively little increase in speed."

Considering the work of R. M. Gagné, which one of the following diagrams best depicts the category of learning (S = stimulus; R = response), operative at this time:

a) $S \rightarrow R \rightarrow R \rightarrow R$

b) $S \rightarrow S \rightarrow S \rightarrow R$

c) $\begin{matrix} S \\ \text{or} \\ S \end{matrix} \rightarrow R$

d) $\begin{matrix} & R \\ & \nearrow \\ S & \text{or} \\ & \searrow \\ & R \end{matrix}$

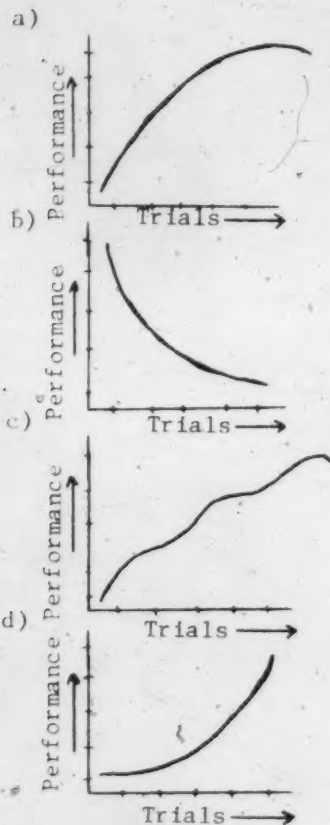
34. In practicing vocational skills it is probably better to practice according to the method known as the:
- a) whole method
 - b) part method
 - c) whole - part - whole method
 - d) part - whole - part method
35. Reaction times generally increase as a result of:
- a) increased practice
 - b) increased intensity of the stimulus
 - c) decreased temporal uncertainty of a stimulus
 - d) increased temporal uncertainty of a stimulus

Humans have certain limitations when it comes to performing skills. These limitations can be classified into five main categories. These categories are the ability to: 1) discriminate, 2) recognize, 3) time, 4) remember, and 5) generalize. The following three questions refer to these limitations.

36. You observed that a learner had more difficulty than other students in learning a new skill shortly after learning a previous similar skill. This is an example of which category of limitation:
- a) time
 - b) discriminate
 - c) generalize
 - d) remember
37. Which limitation involves the ability to detect differences:
- a) remember
 - b) discriminate
 - c) recognize
 - d) generalize

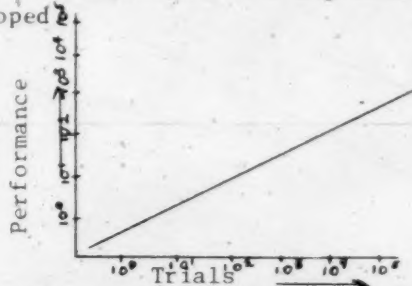
38. Which limitation is closely related to one's ability to handle spatial problems:
- a) time
 - b) remember
 - c) generalize
 - d) recognize
39. Relative to transfer in training between motor skills involving similar patterns, which statement best represents the instructional procedures that should be employed:
- a) these two skills should be taught at the same time
 - b) these two skills should not be taught at the same time
 - c) identical methods should be employed
 - d) the instructor should use examples from the first skill learned to demonstrate how the second skill should be learned
40. Robert M. Gagné outlined eight categories of learning in his famous work "Conditions for Learning." Which of the following of Gagné's categories could be classified as a psychomotor category:
- a) principal learning
 - b) signal learning
 - c) chaining
 - d) problem solving
41. Many skills are easily measured by measuring the amount of information processed by the learner over a specific amount of time (ie: measurement of typing speed/accuracy). The highest speed/accuracy relationship is attained when the error rate of information processed is about:
- a) 1%
 - b) 10%
 - c) 25%
 - d) 50%

42. Which of the following graphs would best represent the increase in performance from the early stage of learning a skill to the final stages of learning a skill:



43. In practicing a motor skill, an early emphasis on developing speed is important if:
- a) the nature of the skill is continuous
 - b) the nature of the skill is discrete
 - c) accuracy is a vital part of the task
 - d) speed is a vital part of the task

44. If the performance of a group of learners is plotted on a graph with the scale for # of trials expressed on a log scale, the following graph (below) is developed:



Which of the following statements best expresses the significance of this graph relative to the amount of practice required to attain a certain specified level of skill:

- a) very little increase in performance relative to amount of practice is attained at the beginning of practicing a new skill
 - b) very little increase in performance relative to amount of practice is attained at the end (or when approaching maximum skill level) of practicing a skill
 - c) the amount of change in performance is directly proportional to the amount of practice for all stages of skill development
 - d) the amount of change in performance is inversely proportional to the amount of practice for all stages of skill development
45. In comparing the following two teaching methods, which would be the most accurate statement relative to the effectiveness of these methods in helping learners develop motor skills.
- The two methods are:
- Method (1) verbal instruction plus practice
 - Method (2) trial-and-error practice only
- a) these methods would perform differently for different kinds of skills or for different kinds of learners
 - b) there is no difference in the effectiveness of these methods
 - c) method (1) is better than method (2)
 - d) method (2) is better than method (1)

Psychomotor Learning - Form B

Name: _____

Time: 1 Hour

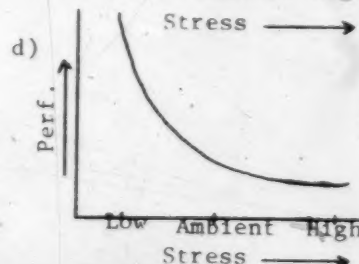
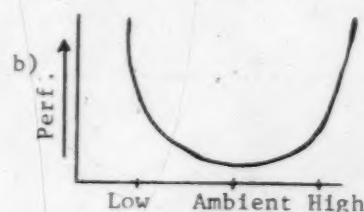
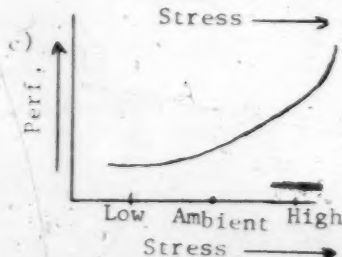
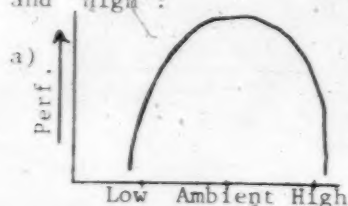
Directions:

1. Answer all 45 questions.
 2. Choose the best answer for each question.
 3. All answers are to be recorded on the answer sheet with a soft pencil.
 4. Please do not write on this question booklet.
 5. Please return both the question booklet and answer sheet.
 6. Be sure your name is on the answer sheet and on this page of the question booklet.
 7. Thank you.
- 

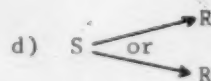
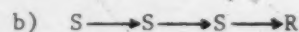
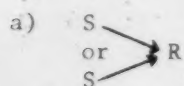
1. Learners tend to adopt individual forms and styles (posture, grip, etc.) when developing a motor skill. Instruction on "standardized" forms and styles:
 - a) should never be given
 - b) should be given only at the late stages in learning
 - c) should be given only at the earlier stages in learning
 - d) should be given at all stages in learning
2. Probably the best time to give an adult learner verbal instructions (feedback) is when he is practicing a motor skill is:
 - a) when he finds it necessary to ask for it
 - b) at the very beginning of the practice session
 - c) at the very end of the practice session
 - d) all the time (throughout the entire practice session)
3. The fact that many musicians can play music together and keep "perfect time" is attributed to the fact that:
 - a) they have practiced together
 - b) they were born with special ability to measure time
 - c) they have very short simple reaction time abilities
 - d) temporal uncertainty in music is zero
4. When a learner is required to sort out certain stimuli from a large number being received in succession, and is to respond to only certain (a very few) of these stimuli he is engaging in:
 - a) a tracking task
 - b) a vigilance task
 - c) an ambient task
 - d) a decrement task

5. If speed is a vital part of a skill, which of the following statements is most true:
- a) accuracy should be developed first then place an emphasis on speed development
 - b) emphasis on developing speed should be at an early stage in learning
 - c) emphasis on developing speed should be at the final stage of learning
 - d) no emphasis should be placed on developing speed
6. The level or phase in D. W. Manuel's five level taxonomy of psychomotor objectives where the learner first actually attempts to perform a skill is:
- a) level five
 - b) level two
 - c) level one
 - d) level three
7. D. W. Manuel's taxonomy of psychomotor objectives would have as the lowest level (first phase) the following heading:
- a) set
 - b) perception
 - c) autonomous
 - d) associative
8. The "hypothesis of par" is the label for the phenomena where for most learning tasks, individuals set for themselves some standard of excellence. Which statement is most true relative to this standard of excellence:
- a) learners typically perform below this standard
 - b) learners typically never try to achieve this standard
 - c) learners typically perform above this standard
 - d) learners typically perform above this standard if encouraged to do so

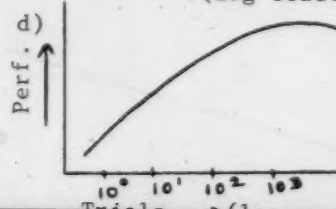
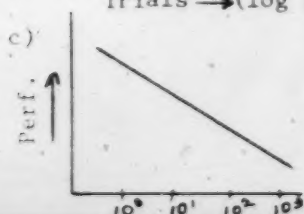
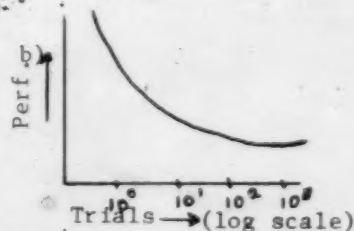
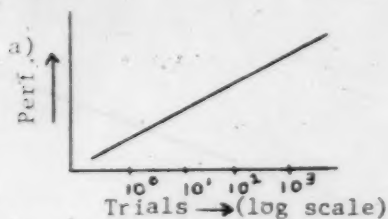
9. Feedback should help a learner improve with practice. Which form of feedback is most useful in the majority of skill learning activities:
- verbal feedback (someone telling the learner what his performance looked like)
 - visual feedback (viewing the results of one's own movements)
 - kinesthetic feedback (paying attention to one's own muscular feelings)
 - tactile feedback (feeling how the performance is by touching)
10. Which approach to the "analysis of skills" has as the variables to measure, a list similar to: concept of purpose, scanning, identification of relevant cues, interpretation of cues, etc.:
- information-processing analysis
 - component processes analysis
 - factor structure analysis
 - continuums analysis
11. Robert M. Gagné outlined eight categories of learning in his famous work *Conditions for Learning*. The second and third categories [stimulus response learning (operant conditioning) and chaining (motor response sequences)] can be viewed as psychomotor categories. At what level in skill development as described below would "chaining" play a significant role:
- the learner is preparing to try a skill for the first time
 - the learner has just tried a skill for the first time
 - the learner has been practicing a skill for some time and is at this stage attempting to eliminate errors
 - the learner has achieved a high level of skill after much practice
12. Which of the following graphs best represents the relationship between performance and the three generalized levels of stress: "low", "ambient", and "high":



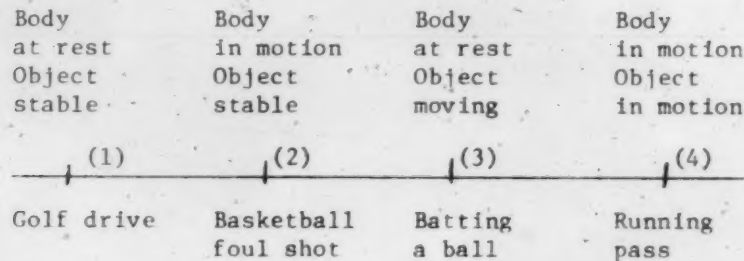
13. Skilled performance is classified as such only when the situation exhibits the presence of three essential features. Two of these features are:
 1) the presence of an organized sequence of movements and, 2) the presence of a purpose (or being "goal directed"). The third essential feature is:
- the presence of feedback
 - the presence of a reasonable amount of accuracy
 - the presence of a reasonable amount of speed
 - the presence of stress
14. Instructions given to a learner at the stage where he is getting ready to perform a task should be:
- acquired through intrinsic feedback
 - acquired through extrinsic feedback
 - primarily concerned with describing the principles of the task
 - primarily concerned with describing how to develop speed in the task
15. "Chaining", one of R. M. Gagne's categories of learning which can also be called a psychomotor category, is depicted best in which one of the following diagrams:



16. Which of the following graphs would best represent the relationship between "amount of practice" and "amount of increase in performance" usually observed of groups of learners developing a skill:



17. Skills can be analyzed on the basis of various kinds of continuums. One such continuum deals with the skill constancies. This continuum is presented here:



Which place on the continuum (represented by numbers from 1 to 4) represents where skills are more complex and hardest to analyze:

- a) (1)
 - b) (2)
 - c) (3)
 - d) (4)
18. Fatigue occurs more often than loss of alertness when a person is functioning in a work (or learning) situation which is classified as:
- a) an open-ended task
 - b) a closed task
 - c) a tracking task
 - d) a vigilance task
19. An Air Traffic Controller's job involves paying attention to, and responding to many, many stimuli for relatively long periods of time. This type of situation usually results in:
- a) increased alertness
 - b) decreased alertness
 - c) increased fatigue
 - d) decreased fatigue

20. Which of the following types of reaction situations would normally exhibit the longest reaction time:

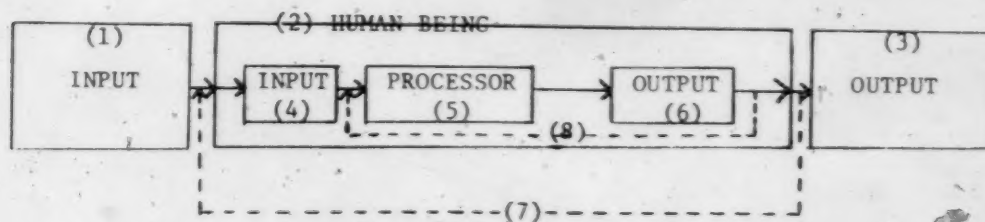
a) simple reaction time - $1.S \rightarrow 1.R$

b) a number of stimuli for one of which R is the required response -
 $S -$
 $S -$
 $S - R$
 $S -$

c) any one of a number of stimuli with its own response - $S1 \rightarrow R1$ or $S2 \rightarrow R2$, or $S3 \rightarrow R3$.

d) a stimulus with two chained responses - $S \rightarrow R \rightarrow R$

Below is a model of human performance. This model depicts the general makeup of the human performer and helps identify where various "problems" can arise when a person is attempting to perform a skill. Refer to this model when answering questions 21 to 26 inclusive. Answer these questions by identifying the areas depicted on the model by the numbers 1 through 8.



A Model of Human Performance

21. At what area on the model of human performance would stimuli from the environment occur:

a) 8

b) 4

c) 3

d) 1

22. Sometimes a person can "feel" when he has completed a physical task well (ie: a good golf swing). What place on the model of human performance associates with this phenomena:

a) 2

b) 6

c) 7

d) 8

23. If you concluded that a learner did not have the mental capacity to understand how to perform complex physical behaviors (complex skills), at what point on the model would this deficiency be depicted:
- a) 4
 - b) 5
 - c) 6
 - d) 7
24. Suppose you had given a demonstration on how to perform a certain operation on a certain piece of equipment. Further suppose that one learner could not see the demonstration because he was too far away. Where on the model of performance could this problem be shown and subsequently help to explain the learner's inability to learn the task:
- a) 2
 - b) 1
 - c) 4
 - d) 3
25. Where on the model of human performance would a learner's physical inability (lack of size, strength, etc.) effect the nature of his physical behavior:
- a) 3
 - b) 6
 - c) 5
 - d) 2
26. If you concluded that a learner had difficulty in completing a physical task well because he had received too much to learn in too short of time, then to what part of the human model of performance would you associate this problem:
- a) 2
 - b) 5
 - c) 6
 - d) 3

27. Reaction times generally decrease:
- a) with an increase in the intensity of the stimuli
 - b) with a decrease in the intensity of the stimuli
 - c) when the intensity of stimuli goes below the threshold
 - d) after long periods of no practice
28. If a learner was attempting to master a skill and was rated as performing at the "autonomous phase" of learning, his general observable behavior would be something like:
- a) the learner is performing very slow, performs in short steps, and makes many errors
 - b) the learner is only preparing his work station before starting to work
 - c) the learner is working reasonably fast and is making only a very few errors but his performance is interrupted easily by someone watching or attempting to talk to him
 - d) the learner is working fast and is making only a very few errors and is at the same time discussing an upcoming fishing trip with another person
29. Motor skills can be improved by engaging in mental practice (mental rehearsal for instance). The above statement:
- a) applies only to very simple skills
 - b) applies best when learning is taking place at the advanced level
 - c) applies best when learning is in its early stages
 - d) is not true.
30. Which one of the following statements is generally true with respect to the average person who is beginning to learn a new motor skill:
- a) he does not fatigue easily
 - b) he makes "extra" movements
 - c) he does not learn from imitation
 - d) he is generally motivated more to learn than the person who is "mastering" a skill

One's ability to perform a skill well is inhibited by certain limitations. These limitations in one's ability can be categorized into five groups. These are the ability to: 1) discriminate, 2) recognize, 3) time, 4) remember, and 5) generalize. The following three questions, (31, 32, and 33) make reference to these five main limitations.

31. The ability to handle spatial problems is most closely related to the ability to:
 - a) remember
 - b) discriminate
 - c) recognize
 - d) time
32. Which limitation involves the ability to place information (or stimuli) into a correct category:
 - a) recognize
 - b) remember
 - c) generalize
 - d) time
33. Which limitation would effect a learner's ability to use the skills learned in one skill to help learn a different skill:
 - a) remember
 - b) discriminate
 - c) recognize
 - d) generalize
34. Four component functions are recognized as one basis for the analysis of skills. These component functions are: 1) sensory, 2) perceptual, 3) memory, and 4) responses. Which of these four component functions relate to: - variety, accuracy, timing, repetition, and refractory period:
 - a) sensory
 - b) perceptual
 - c) memory
 - d) responses

35. Examine the following graph which depicts the development of skill showing how each of the "phases" tend to exhibit a plateau in the rate of learning:



- Which place on the graph (identified by numbers) represents where the learning has reached the "associative" phase:
- 1
 - 2
 - 3
 - 4
36. Stimulus generalization plays a significant role in the development of a skill. It is generally defined as the substitution of new stimuli for an old stimuli which has the ability to cause the same conditioned response to occur. At what phase (or phases) in the development of a skill would stimulus generalization come into play:
- early or "cognitive" phase
 - intermediate or "associative phase"
 - final or "autonomous" phase
 - both b) and c)
37. Extrinsic feedback (feedback which is external to the learner) is generally thought to serve three basic functions in learning a skill. Two of these are: 1) to provide knowledge, and 2) to provide reinforcement. The third generally accepted function of extrinsic feedback is to provide:
- tension
 - stress
 - stimuli
 - motivation

38. Consider these two instructional methods:

- Method (1) - demonstration plus practice,
- Method (2) - trial-and-error practice only.

Which of the following statements would be most accurate relative to the efficiency of these two methods in teaching motor skills:

- a) method (1) is better than method (2)
 - b) method (2) is better than method (1)
 - c) these methods would work differently for different kinds of skills or for different learners
 - d) these methods would work equally well in most instances
39. Manual guidance of gross skills is thought to be most useful in molding movements into the desired forms:
- a) when instructing adults
 - b) in the final phase of skill development
 - c) before incorrect habits are formed (early stages of development)
 - d) when instructing young learners
40. Increased temporal uncertainty of a stimulus will:
- a) result in easier choices between responses
 - b) cause reaction times to decrease
 - c) cause reaction times to increase
 - d) will not affect a change in reaction times
41. Which statement below best describes how stress effects learning rates in learning a skill:
- a) constant high stress is best for maximum learning rates
 - b) constant low stress is best for maximum learning rates
 - c) intermittent or fluctuating levels of stress are best for maximum learning rates
 - d) stress has no effect upon learning rates

42. Negative transfer of training can occur when the two skills being learned:

- a) have the same perceptual components
- b) have different patterns
- c) are taught at quite different times and by different methods
- d) have similar patterns

43. Generally as one attempts to increase the speed of skill, errors begin to happen. This speed/accuracy trade-off phenomena is evident in many areas of skill development. Generally the highest speed/accuracy relationship which can be achieved is achieved when the number of errors amounts to approximately _____ % of the total amount of information processed:

- a) 0.5
- b) 25.0
- c) 10.0
- d) 1.0

44. Consider the following two types of reaction situations:

Type (1) any one of a number of stimuli with each having its own response - $S_1 \rightarrow R_1$, $S_2 \rightarrow R_2$, $S_3 \rightarrow R_3$.

Type (2) simple reaction time - $S \rightarrow R$

Which of the following statements would be true with respect to these two types of reaction situations:

- a) type (2) would have a longer reaction time than type (1)
- b) type (1) would have a longer reaction time than type (2)
- c) these two types of reaction times cannot be measured and compared
- d) there is essentially no difference in the reaction times for these two types of reaction situations.

45. Practicing a skill can involve long continuous periods of practice (massed practice) or it can be accomplished by short periods of practice with intervals of rest between (distributed practice).

If the intervals of rest in a distributed practice situation are approximately equal to the length of the practice sessions then which of the following statements is most true:

- a) better performance would be attained if the rest intervals were longer
- b) better performance would be attained if the rest intervals were shorter
- c) there would not likely be any difference in performance if the rest intervals were longer or shorter
- d) better performance would be attained if the rest intervals were very close to one-half as long as the practice sessions.

APPENDIX C
CURRICULUM BIBLIOGRAPHY

CURRICULUM BIBLIOGRAPHY

- Ammons, Margaret. "Objectives and Outcomes," pp. 908-914 in Robert L. Ebel (ed.), Encyclopedia of Educational Research, Fourth Edition. New York: Macmillan, 1969.
- Baker, R.L. Curriculum Evaluation; Review of Educational Research. 1969, 39, pp. 339-358.
- Bebell, C.F. The Educational Program: Part One; In Emerging Designs For Education. E. L. Morphet & D. L. Jesser (Eds.), New York: Citation Press, 1968, pp. 1-56.
- Bellack, A.A. "History of Curriculum Thought and Practice"; Review of Educational Research. 1969, pp. 283-292.
- Berman, L.M. New Priorities in the Curriculum. Columbus, Ohio: Charles E. Merrill, 1968.
- Blanke, Virgil, E. (Ed.). "Planning for Educational Change"; Theory Into Practice. Vol. V, No. 1, February, 1966.
- Bobinger & Weaver. Trade Analysis and Course Organization. 1968.
- Broudy, Harry S. "The Philosophical Foundations of Educational Objectives," Educational Theory, 20 (Winter, 1970), 3-21.
- Bruner, Jerome. "The Skill of Relevance or the Relevance of Skills." Saturday Review, 53 (April 18, 1970), pp. 66-68. 78-79.
- Carr, William G. (Ed.). Values and the Curriculum: A Report of the Fourth International Curriculum Conference. 1970.
- Clark, David L. and Egon G. Buga. "An Examination of Potential Change Roles in Education," pp. 110-113 in Center for the Study of Instruction, Rational Planning in Curriculum and Instruction. Washington, D.C.: National Education Association, 1967.
- Cunningham, Luvern L. "Effecting Organization Change"; Organization - A Means for Improved Instruction. L.W. Downey, et al. (Eds.), 1962 Leadership Course for School Principals, pp. 104-129.
- Downey, L.W. "Goals of Education for the Future"; Encyclopedia of Education. 1971.
- Easley, J.A. Jr. "Curriculum Development, Teacher Education and Educational Research." Paper given at Allerton House, 1967.
- Easley, J.A. Jr. "The Natural Sciences and Educational Research - A Comparison," High School Journal, 50 (October, 1966), pp. 39-50.
- "Formulating Instructional Objectives," and "Stating Objectives," pp. 300-303 in John D. McNeil, "Forces Influencing Curriculum," Review of Educational Research, 39 (June, 1969), pp. 293-318.

- Foshay, Arthur W. Curriculum for the 70's: An Agenda for Invention. 1970.
- Gagné, Robert M. "Learning Hierarchies," Educational Psychologist, 6 November, 1969, pp. 3-6.
- Gallagher, James J. "The Changing Face of Educational Research and Development." Paper given at A.E.R.A., Minneapolis, 1970.
- Joyce, Bruce R. and Berj Harootunian. The Structure of Teaching. Chicago: Science Research Associates, 1967.
- Kibler, Robert J., Larry L. Barker, David T. Miles. Behavioral Objectives and Instruction. Boston: Allyn and Bacon, 1970.
- Light, Richard J. and Paul V. Smith. "Choosing a Future: Strategies for Designing and Evaluating New Programs," Harvard Educational Review, 40 (February, 1970), pp. 1-28.
- Macdonald, James B. "Educational Models for Instruction - Introduction," pp. 1-7 in James B. Macdonald and Robert R. Leeper (eds.), Theories of Instruction. Washington, D.C.: Association for Supervision and Curriculum Development, 1965.
- Maguire, Thomas O. "Decisions and Curriculum Objectives," Alberta Journal of Educational Research, 15 (1969), pp. 17-30.
- Payne, Arlene. The Study of Curriculum Plans. Washington, D.C.: National Education Association, 1969.
- Popham, W. James. "Curriculum Materials," Review of Educational Research, 39 (June, 1969), pp. 319-338.
- Popham, W. James, et al. Instructional Objectives, AERA Monograph Series on Curriculum Evaluation, 3. Chicago: Rand, McNally, 1969.
- Popham, W. James and Eva L. Baker. Planning and Instructional Sequence. Englewood Cliffs, New Jersey. Prentice-Hall, 1970.
- Pyatte, Jeff A. "Functions of Program Evaluation and Evaluation Models in Education" High School Journal, 53 (April, 1970), pp. 385-700.
- Short, Edmund C. "Curriculum Scholarship: Sources of Knowledge for the Curriculum Field," pp. 7-19 in Edmund C. Short (ed.), A Search for Valid Content for Curriculum Courses.
- Stake, Robert E. "Generalizability of Findings" and "Rationalism and Empiricism," William H. Beatty (ed.), Improving Educational Assessment and An Inventory of Measures of Affective Behavior. Washington, D.C.: Association for Supervision and Curriculum Development, 1969.

- Stake, Robert E. "Objectives, Priorities and Other Judgment Data." Review of Educational Research, 40 (April, 1970), pp. 181-212.
- Stake, Robert E. and Terry Denny. "Needed Concepts and Techniques for Utilizing More Fully the Potential of Evaluation," pp. 370-390 in Ralph W. Tyler (ed.), Educational Evaluation: New Roles and New Means. NSSE 68th Yearbook, Part II, 1969.
- Telfer, Richard G. "Dynamics of Change: Focus Behind Curriculum Modification," Clearing House, 41 (November, 1966), pp. 131-135.
- Tyler, Ralph W. Basic Principles of Curriculum and Instruction. Chicago: University of Chicago Press, 1969, pp. 479-481.
- Tyler, Ralph W, et al. Perspectives on Curriculum Evaluation. AERA Monograph Series on Curriculum Evaluation, 1. Chicago: Rand McNally, 1967.
- Walberg, Herbert J. "A Model for Research on Instruction," School Review, 78 (February, 1970), pp. 185-200.
- Westbury, Ian. "Curriculum Evaluation." Review of Educational Research. 40 (April, 1970), pp. 239-260.
- What Are the Sources of the Curriculum? Washington, D.C.: Association for Supervision and Curriculum Development, 1962.
- Wittenlock, Merle and David Wiley. The Evaluation of Instruction. New York: Holt, Rinehart, and Winston, 1970.
- Worth, Walter, H. Report of the Commission on Educational Planning. Edmonton, Queen's Printer, 1972.
- Zidonis, Frank J. "Effecting Curriculum Change Through Research." Theory Into Practice, 6 (April, 1967), pp. 85-88.

APPENDIX D
DATA COLLECTION INSTRUMENTS

General Biographical Information

Name: (please print) _____

Age: (check one) under 20 years ☐
 20-24 years ☐
 25-29 years ☐
 30-34 years ☐
 35-39 years ☐
 40-44 years ☐
 45-49 years ☐
 50 years & over ☐

Formal Education: (ie. high school, college, university, etc.)

high school completed yes ☐ no ☐number of years beyond high school (approx.) less than 1 year ☐1 year ☐2 years ☐3 years ☐4 years ☐5 or over ☐Briefly describe type(s) of formal education received beyond
highschool.

Work Experience: Please list types of work experience you have had to date including teaching experience. Please list these in a chronological order and estimate the amount of time (in years to the nearest 1/2 year) that you contributed to each experience.

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Work Exp: _____ Time: _____

Name: _____

TEACHING ADULTS

What do you consider to be the single most important feature about the nature of adult students to be considered when teaching a class of adults?

When teaching a class of adults which of the following features about the nature of adult students do you consider to be most important?

Directions: For each pair of statements below mark with a tick (✓) the feature you consider most important. Remember:

- A. The question printed above is the question you are trying to answer for each pair of features.
- B. Please place one tick (✓) for each pair of features.

- | | |
|---|--|
| 1. The adult student tends to be afraid of failure at the beginning of a new learning task. | |
| The adult student is generally impatient in the pursuit of learning objectives. | |
| 2. The adult student usually requires a longer time to perform learning tasks. | |
| The adult student tends to be afraid of failure at the beginning of a new learning task. | |
| 3. The adult student is likely to be rigid in his attitudes and beliefs. | |
| The adult student is generally impatient in the pursuit of learning objectives. | |
| 4. Adults are sometimes fatigued when they attend classes. | |
| The adult student is likely to be rigid in his attitudes and beliefs. | |
| 5. Adults are easily distracted by inappropriate (noisy, etc.) learning environments. | |
| The adult student usually requires a longer time to perform learning tasks. | |
| 6. Adults are sometimes fatigued when they attend classes. | |
| Adults are easily distracted by inappropriate (noisy, etc.) learning environments. | |

- | | |
|-----|--|
| 7. | The adult student is generally impatient in the pursuit of learning objectives. |
| | The adult student usually requires a longer time to perform learning tasks. |
| 8. | The adult student tends to have difficulty in remembering isolated facts. |
| | The adult student is generally impatient in the pursuit of learning objectives. |
| 9. | The adult student is likely to be rigid in his attitudes and beliefs. |
| | The adult student usually requires a longer time to perform learning tasks. |
| 10. | Adults are easily distracted by inappropriate (noisy, etc.) learning environments. |
| | The adult student tends to have difficulty in remembering isolated facts. |
| 11. | The adult student tends to have difficulty in remembering isolated facts. |
| | The adult student usually requires a longer time to perform learning tasks. |
| 12. | Adults are easily distracted by inappropriate (noisy, etc.) learning environments. |
| | The adult student tends to be afraid of failure at the beginning of a new learning task. |
| 13. | The adult student tends to be afraid of failure at the beginning of a new learning task. |
| | The adult student tends to have difficulty in remembering isolated facts. |

- | | | |
|-----|--|--|
| 14. | Adults are easily distracted by inappropriate (noisy, etc.) learning environments. | |
| | The adult student is likely to be rigid in his attitudes and beliefs. | |
| 15. | The adult student tends to be afraid of failure at the beginning of a new learning task. | |
| | Adults are sometimes fatigued when they attend classes. | |
| 16. | The adult student is generally impatient in the pursuit of learning objectives. | |
| | Adults are easily distracted by inappropriate (noisy, etc.) learning environments. | |
| 17. | The adult student tends to have difficulty in remembering isolated facts. | |
| | Adults are sometimes fatigued when they attend classes. | |
| 18. | The adult student tends to be afraid of failure at the beginning of a new learning task. | |
| | The adult student is likely to be rigid in his attitudes and beliefs. | |
| 19. | Adults are sometimes fatigued when they attend classes. | |
| | The adult student usually requires a longer time to perform learning tasks. | |
| 20. | The adult student tends to have difficulty in remembering isolated facts. | |
| | The adult student is likely to be rigid in his attitudes and beliefs. | |
| 21. | Adults are sometimes fatigued when they attend classes. | |
| | The adult student is generally impatient in the pursuit of learning objectives. | |

SKILL LEARNING - A RATING SCALE

Below are six statements relative to the learning of skills. Read each statement carefully and then check (✓) one of the columns opposite each statement.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. People who have trouble in academic" programs usually do very well in "vocational" programs.					
2. Motor skills can be learned very quickly.					
3. Compared to "cognitive" learning environments, the learning environment for the development of motor skills is better suited to individual learning.					
4. Trial and error techniques should be an integral part of the learning activities in skill development programs.					
5. Motor skills are harder to learn than cognitive skills.					
6. Lack of motivation is not a problem generally associated with the learning of motor skills.					

Name: _____

ADULT LEARNING - A RATING SCALE

Below are seven statements about adult students. Read each statement carefully and then check (✓) one of the columns opposite each statement.

	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
1. The adult student is likely to be rigid in his attitudes and beliefs.					
2. The adult student is generally impatient in the pursuit of learning objectives.					
3. The adult student tends to have difficulty in remembering isolated facts.					
4. The adult student usually requires a longer time to perform learning tasks.					
5. The adult student tends to be afraid of failure at the beginning of a new learning task.					
6. Adults are sometimes fatigued when they attend classes.					
7. Adults are easily distracted by inappropriate (noisy, etc.) learning environments.					

APPENDIX E
JUDGMENT MEETING HANDOUTS

EVALUATION THEORIES AND MODELS

An extensive search of the literature has been made to select an evaluation model suitable for the purposes of this research. Only a mention of the major models reviewed is made here. These include:

1. The Expected Opportunity Loss (E.L.O.) Model - Tanner (1970)
2. Transactional Model for Curriculum Evaluation - Parsons & Tenenberg (1970)
3. Uffelman's Model for Analyzing & Comparing Instructional Strategies and Programs - Uffelman (1970)
4. The CEMREL Evaluation Model - Pohland (1970)
5. The CIPP Model - Stufflebeam (1971)
6. A Theoretical Evaluation Model - Taylor & Maguire (1972)
7. Evaluation by Stages - Provus (1972)

Stake's Model

Briefly stated, Stake's Model was selected because it is more applicable than others because of the developmental tasks involved in the study where many unique inputs are anticipated. Stake's Model, an eclectic model, best ensures that the right questions are asked and all the questions are asked. Mackay and Maguire (1971) aptly demonstrate this point.

In summary it is useful to highlight three kinds of models of evaluation. Each reflects the background and concerns of its authors. Neo-Tylerian models such as Walbesser's focus on the learning process and the sequences of objectives necessary for achievement. The role of evaluation is primarily formative. The eclectic models, like Stake's focus on the collection of data both to answer and to raise questions. Administrative models, like

Stufflebeam's are closely tied to the collection of information for particular decisions.

Stake (1967) stresses the importance of collecting data from a wide range of sources. He points out that data are divided into two dimensions: one dimension separates the data into descriptions and judgements; and the other dimension classifies data into antecedent, transaction and outcome. Determining the degree of relationship and agreement among the various classes of data amount to the total evaluation necessary. Figure 1 depicts the layout of Stake's Model.

It is helpful for clarification of the model to distinguish between antecedent, transaction and outcome data. An antecedent, according to Stake (1967) is any condition existing prior to teaching and learning. Transactions are the countless encounters between teachers and students, students and students, students and other personnel and other sources of knowledge or other interfaces with an opportunity to react. The boundaries between what is antecedent data, and what is transaction data are not always totally clear. Outcomes are the data synonymous with achieved abilities, attitudes, knowledges, skills and the like of clients resulting from the educational experience. At the planning stage of an educational program (INTENTS) the boundaries and relationships between antecedents, transactions and outcomes must be specified.

Ideally there is a logical contingency between the three kinds of data. The specification of the intents for the three kinds of data would follow a pattern similar to: 1) expecting these antecedents, 2) and expecting these kinds of transactions, 3) these outcomes should be attained. However, they are not necessarily specified in the timeline sequence suggested by this description.

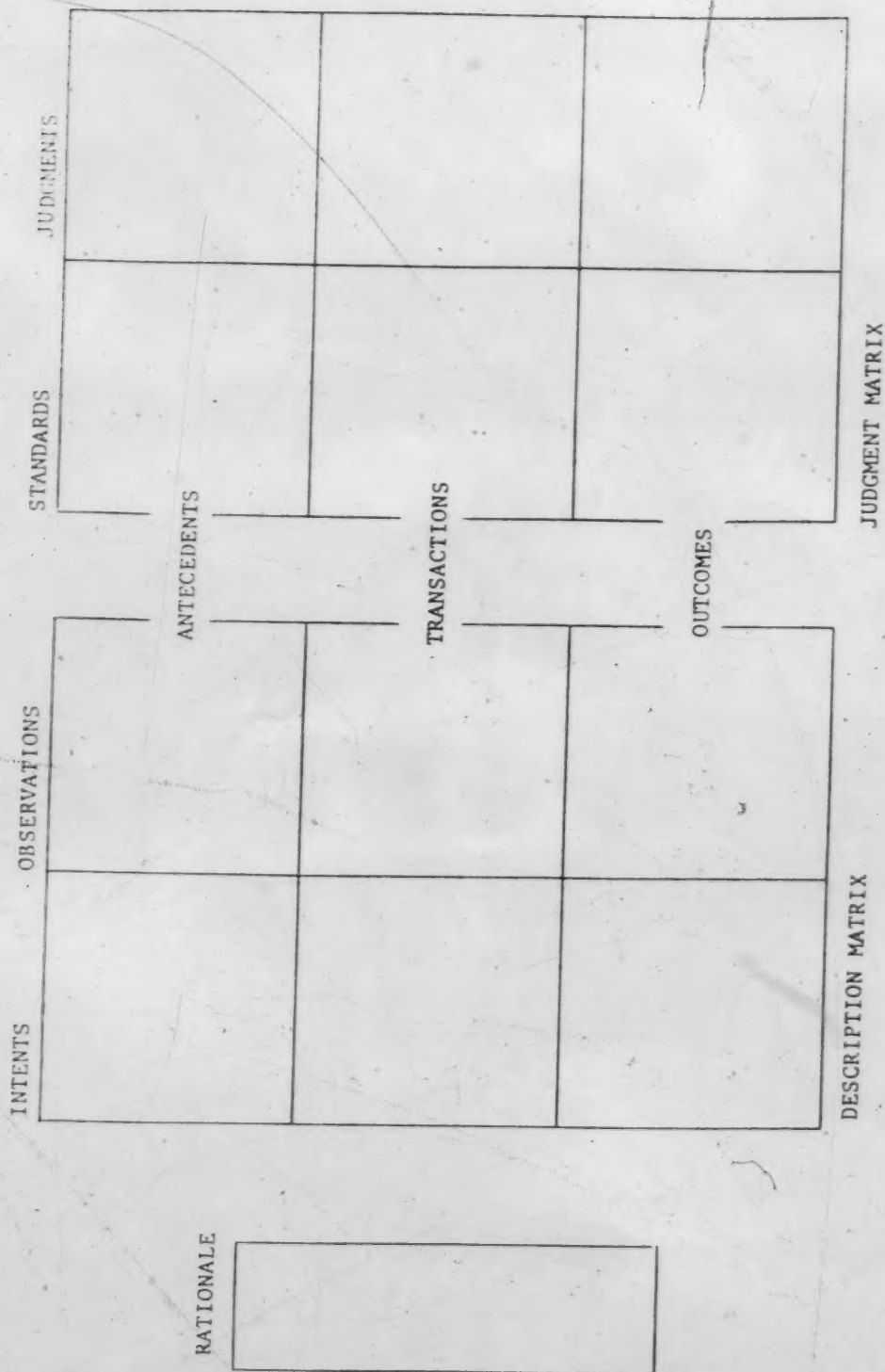


Figure 1. A layout of statements and data to be collected by the evaluator of an educational program.

Examination within the descriptive matrix of Stake's Model helps clarify this relationship. This clarification can only come about by examining the processing activities that are played out in the descriptive matrix, which is represented in Figure 2.

Stake points out that there are two principal ways of processing descriptive data. These are to determine the contingencies among the antecedents, transactions and outcomes; and to find the congruence between intents and observations. Contingencies are of two types, logical and empirical; the first type referring to the relationships that should exist, and the latter type referring to the relationships that are observed to exist. The establishment of logical contingencies is a question of expert judgement and is ideally determined at the planning phase of all educational programs. Empirical contingencies are based on observations and are usually statistical problems of estimating the relationships among variables.

To have a high measure of congruence between the cells of the intended columns and the cells of the observed columns, the intended antecedents, transactions and outcomes would have to come to pass. Mackay and Maguire (1971) make significant statements in regards to congruency by stressing two major points. "Firstly, it may be that incongruence is desirable in the long run, especially, if the intents can be shown to be invalid for some reason. Secondly, congruence does not assure validity, only fidelity" (p.31).

In describing the function of the judgement matrix, Stake (1967) states that there are two bases for judging the characteristics of a program, "1) with respect to absolute standards as reflected by personal judgements and 2) with respect to relative standards as reflected by characteristics of alternate programs" (p.532).

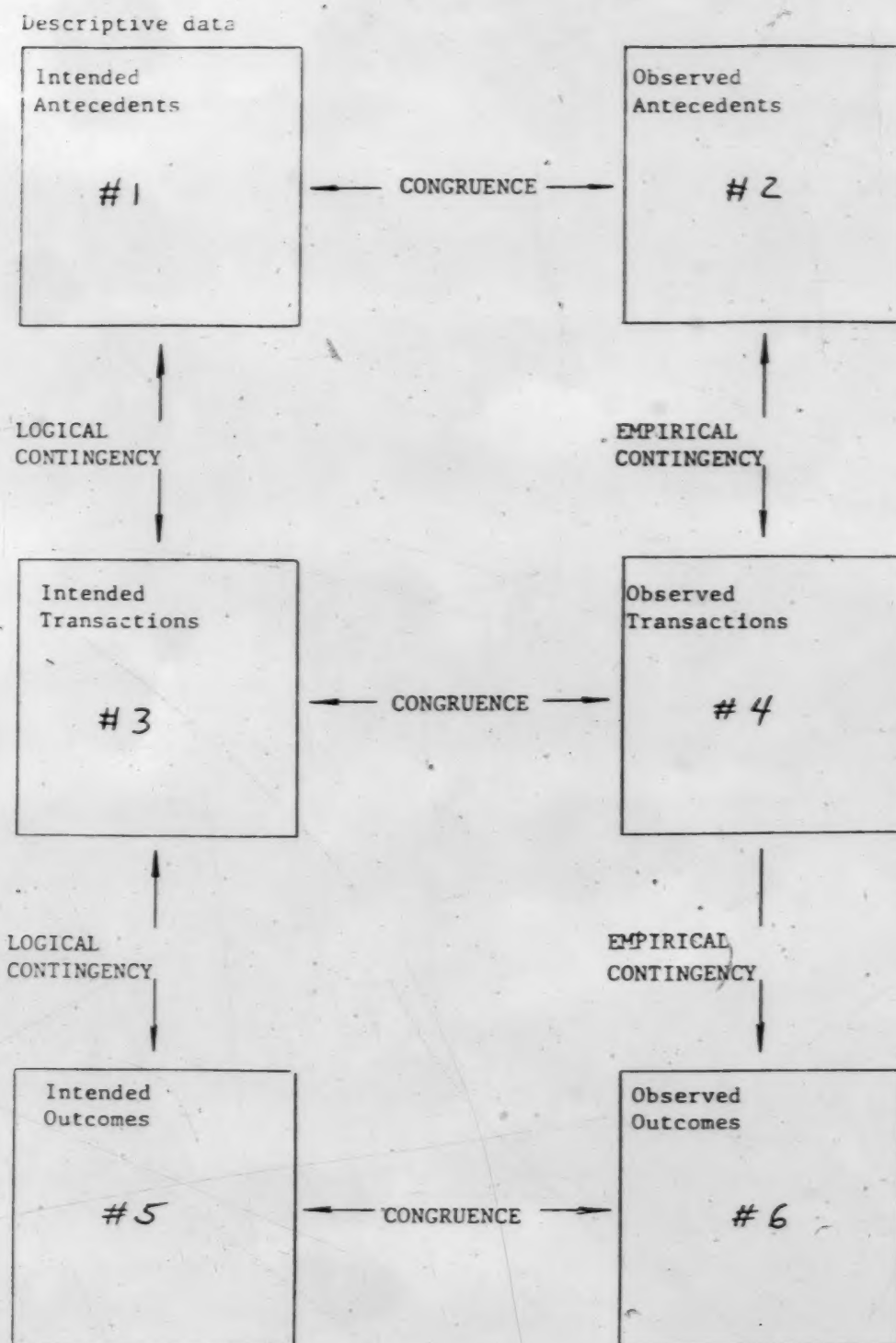


Figure 2. A representation of the processing of descriptive data.

Standards upon which to base the judgements will likewise have to come from either absolute sources (expert selection) or relative sources (other programs or norms). In the same article (1967, p.533) Stake elaborates on the processes of making judgements.

Before making a judgement the evaluator determines whether or not each standard is met. Unavailable standards must be estimated. The judging act itself is deciding which set of standards to heed. More precisely, judging is assigning weight, an importance, to each set of standards. Rational judgement in educational evaluation is a decision as to how to pay attention to the standards of each reference group (point of view) in deciding whether or not to take some administrative action. Relative comparison is accomplished in similar fashion except that the standards are taken from descriptions of other programs. It is hardly a judgemental matter to determine whether one program betters another with regard to a single characteristic, but there are many characteristics and the characteristics are not equally important. The evaluator selects which characteristics to attend to and which reference programs to compare to.

From relative judgement of a program, as well as from absolute judgement we can obtain an overall or composite rating of merit (perhaps with certain qualifying statements); a rating to be used in making an educational decision. From this final act of judgement a recommendation can be composed.

Figure 3 represents the processes of judging the merit of an educational program, and it can be readily seen that data from all six cells of the descriptive matrix must come into play in the decision making.

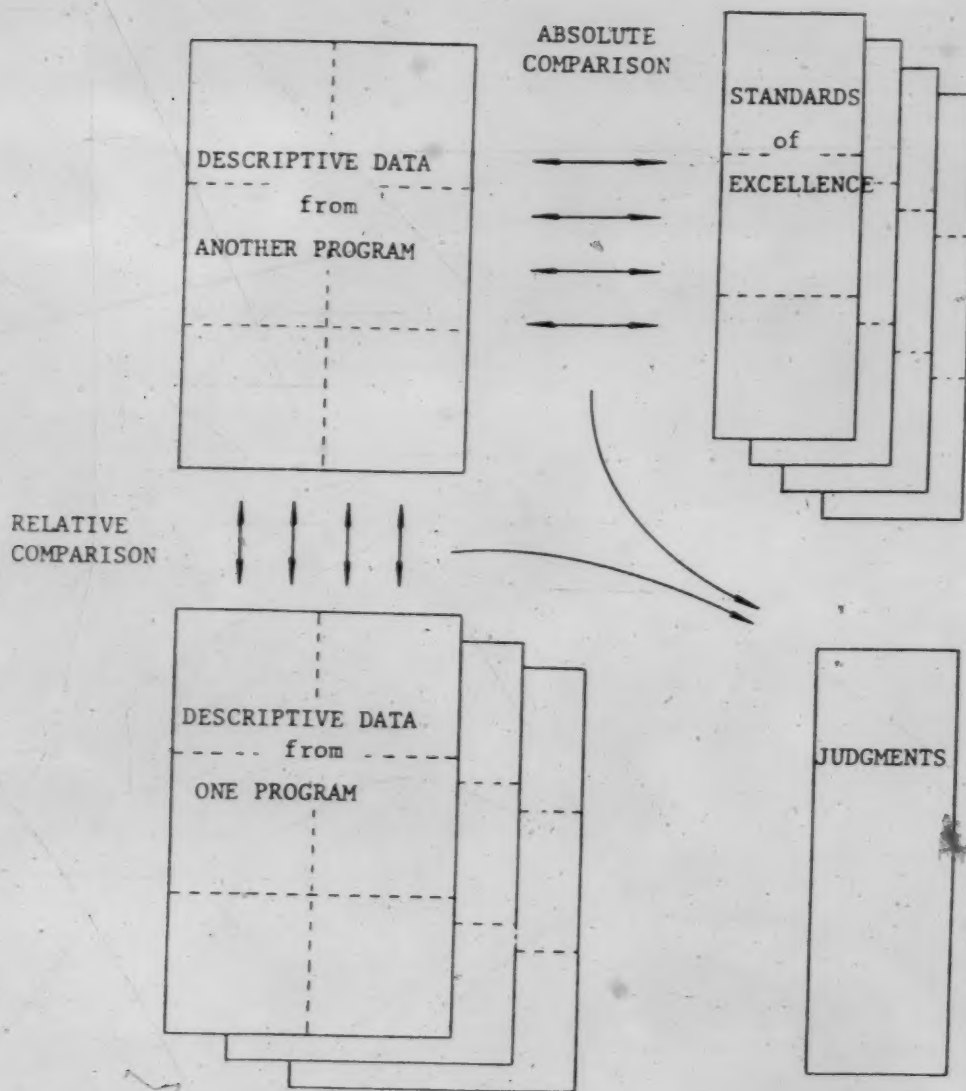


Figure 3. A representation of the process of judging the result of an educational program.

The Rationale. Results of data collection and summarization relative to the "Rationale" of the Stake Model is a direct outcome of the directed interview with Mr. Les Morgan (Director of Research and Staff Development at N.A.I.T.). The results are summarized and presented in paragraph form with identification of the kinds of questions asked and also with additional information offered during the interview.

The major reason why an in-service program is being established at N.A.I.T. is that for the most part hiring of instructional staff employs selection criteria which are heavily weighted towards "technical content" expertise. It is subsequently felt that there is a need for each instructor to be able to perform effectively as a teacher.

The major goals of the total in-service program are to provide skills, knowledge, and an opportunity to develop a competency to perform effectively in the classroom or laboratory. To meet this general goal pedagogical content (i.e. learning psychology, teaching strategies, curriculum development skills, etc.) constitutes the core of the program.

This in-service program will serve all instructional staff. Any instructor who has documented evidence that he or she possesses good pedagogical competencies can participate in the program on a voluntary basis. As can be seen by the format of the program, part is generally compulsory for all instructional staff.

The general format of the program is to have two general categories of in-service offerings. Category A would normally be compulsory and be directed at all new instructional staff. Category B would be voluntary and directed at all instructional staff. Category A will have a decentralized component (handled by the individual teaching departments) and a centralized component (handled by the overall administration of the Institution). The decentralized component includes orientation to the individual teaching departments with an opportunity to identify specific immediate needs prior to instructing, and attempting to meet these specific needs. The centralized component will constitute seven working days of general orientation to policies and procedures of the total Institution and its mandate to clients and industry. This component also includes instruction in safety procedures and first aid procedures.

Category B of the total in-service program at N.A.I.T. has three components. One component provides recognition via a special diploma for instructors who have developed, taught, taken, or challenged courses of technical content within N.A.I.T. A second component provides recognition and encouragement for completion of courses, seminars, etc. offered at other institutions or in industry. The third component, more identifiable as a truly "in-service" program, is a comprehensive program of general and specific pedagogical content. (Researcher's note: This component of the total in-service program at N.A.I.T. is the component within which the sample of modules of curricula were presented and studied.) The content for this component will be offered as credit-hour modules. A module is functionally defined as being independent of any pre-requisite relationship with other units of curricula (other modules).

Module #1 Adult Learning

- a. Each learner will be able to identify the essential characteristics of adult learners and be able to use this knowledge to help design and conduct good adult education programs.

Activities Code

Instructional Objectives

1 L 1

1 R 1

1 R 2

1 R 3

1 R 4

1 R 5 1 R 9

1 R 6

1 R 7

1 L/S 2

1 P 1

I Each learner will comprehend the essential characteristics of adult learners by being able to:

- a) identify several generalizations about adult intelligence.
- b) identify the features of two major kinds of memory processes and how they typically operate within the adult learners; and be able to hypothesize as to which one(s) of the four theories of forgetting play a significant role in the forgetting patterns of typical adult learners.
- c) examine various hierarchies of learning sequences and specifically relate R. M. Gagné's "Conditions for Learning" to the immediate problems of curricula being taught at the present time.
- d) discuss and criticize the general theories of motivation; and be able to relate Maslow's hierarchy of basic needs to the needs of typical adult learners.
- e) List, discuss, and defend several generalizations about the psychological characteristics of adult students you have worked with during the past year; and relative to these generalizations, be able to hypothesize some possible implications for designing and conducting adult education programs.

1 L/S 3-

1 R 8

II Each learner will comprehend and apply the essential considerations relative to designing instruction for adult education programs by being able to:

- a) identify the sources of valid content for adult education courses.

- b) select and help others select appropriate learning tasks.
- c) select and plan for a variety of valid instructional processes.
- d) prepare appropriate instructional objectives for adult learning programs.

1 R 8
1 L/S 4

III Each learner will comprehend and apply the essential considerations relative to managing instruction for adult education programs by being able to:

- a) establish procedures and guidelines for appropriate guidance of adult learners.
- b) establish procedures and guidelines for appropriate feedback to adult learners.
- c) establish and maintain a learning environment suited to the characteristics and needs of adult learners.

Module #5 - Principles of Skill Learning

Curriculum Objectives:

- A) Each learner will be able to identify the essential situations about how people learn skills.
- B) Each learner will be able to apply the knowledges described in A (above) in
 - a) simulated learning environments
 - b) actual learning environments

Instructional Objectives:

- I Each learner will identify the "nature of skills" in civilized man as demonstrated by being able to:
 - a) name the three essential features of skilled performance
 - b) develop a model of human performance which:
 - i) identifies the stage where perception occurs
 - ii) identifies the stage where executive routines are developed
 - iii) distinguish between "formulation of output routines" and "observable performance".
 - iv) identifies and distinguishes the difference between "intrinsic" and "extrinsic" feedback.
 - v) aids in describing at least four possible kinds of observable behavior (output) that could occur for every instance of input.
- II Each learner will develop a taxonomy of psychomotor objectives being able to list each of the five main headings. In addition, each learner will demonstrate his/her understanding of the relationships inherent in the hierarchical structure of the taxonomy by being able to:
 - a) demonstrate by describing classroom examples typical observable behavior exhibited by a learner for each of:
 - i) "early"
 - ii) "associative"
 - iii) "autonomous" phases of skill learning
 - b) describe how "stimulus generalization" enters into the development of skill learning.

- c) draw a simple graph of the rates of development of a skill showing how each of the "phases" tend to exhibit a plateau in learning.
- d) draw a simple graph which helps define the "realistic limits" of a skill and accounts for individual learning differences.

III Each learner will demonstrate his/her knowledge of the interrelationships between motivation and performance by being able to:

- a) define the following:
 - i) hypothesis of par
 - ii) stress
 - iii) alertness
 - iv) fatigue
- b) name three functions of extrinsic feedback
- c) draw a single graph depicting the effect upon performance of i) low, ii) high and iii) ambient stress
- d) describe at least one learning situation where the principles relative to a "vigilance task" are observable.
- e) describe at least one learning situation where the principles relative to a "tracking task" are observable.

IV Each learner will be able to identify, describe, and discuss the different approaches to the "analysis of tasks" of motor skills. The following four approaches should be analyzed.

- a) component processes and performance capacities analysis
- b) continuums for skill analysis
- c) factor structure analysis
- d) information-processing analysis

V Each learner will be able to describe the essential relationships between speed and accuracy components of a skill by being able to:

- a) define "reaction time"
 - b) explain how temporal uncertainty effects simple reaction time
 - c) define type "a", "b", and "c" reaction times and describe how they interrelate to explain the features of "choice" reaction time
 - d) discuss in a seminar the "speed accuracy trade-off phenomena"
-

VI Each learner will be able to:

- a) select from several choices specific learning activities which best facilitate learning for each of the three phases of skill learning
- b) describe two generalizations relative to massed and distributed practice in learning a skill
- c) describe two generalizations relative to whole-part practice in learning a skill
- d) describe several general procedures of instruction for the teaching of motor skills.

ANTECEDENTS (Clients)

	INTENDED		OBSERVED		
	25		M.W. group 19	T.R. group 24	
#per module					
Age:					
range	25 - 55		25 - 60	27 - 61	
mean	35		38.7	41.4	
Completed H.S.:					
yes	75%		77%	68%	
no	25%		23%	32%	
Education Beyond H.S.:					
less than 1 year	30%		18%	48%	
between 1 year and a degree	45%		32%	28%	
degree completed	25%		50%	24%	
Pedagogical Instruction:					
none	70%		79%	76%	
some	25%		16%	12%	
certified	5%		5%	12%	
Experience: (Teaching)					
none	Adult %	Other %	Adult %	Other %	Other %
less than 1 year	0	80	0	79	83
2 years	0	0	0	0	0
3 - 5 years	30	0	32	0	0
5 or more	40	10	36	0	4
Work Experience (Mean)	30	10	32	21	13
	5 years		7.3 years		8.8 years

ANTECEDENTS (Resource Person)

The resource person (teacher) is identified to instruct for both modules was the researcher. Those qualifications pertinent to the tasks of instruction in the two modules, in the context of adult in-service instructor education are:

Age - 34 years

Education - B.Ed. in Industrial Arts

M.Ed. in Industrial Education

Ph.D. candidate in Educational Psychology

Teaching Experience - Two years in Jr.-Sr. High School

Eight years teaching in Faculty of Education

Planning and conducting several in-service programs, workshops, etc. in Adult context over past five years

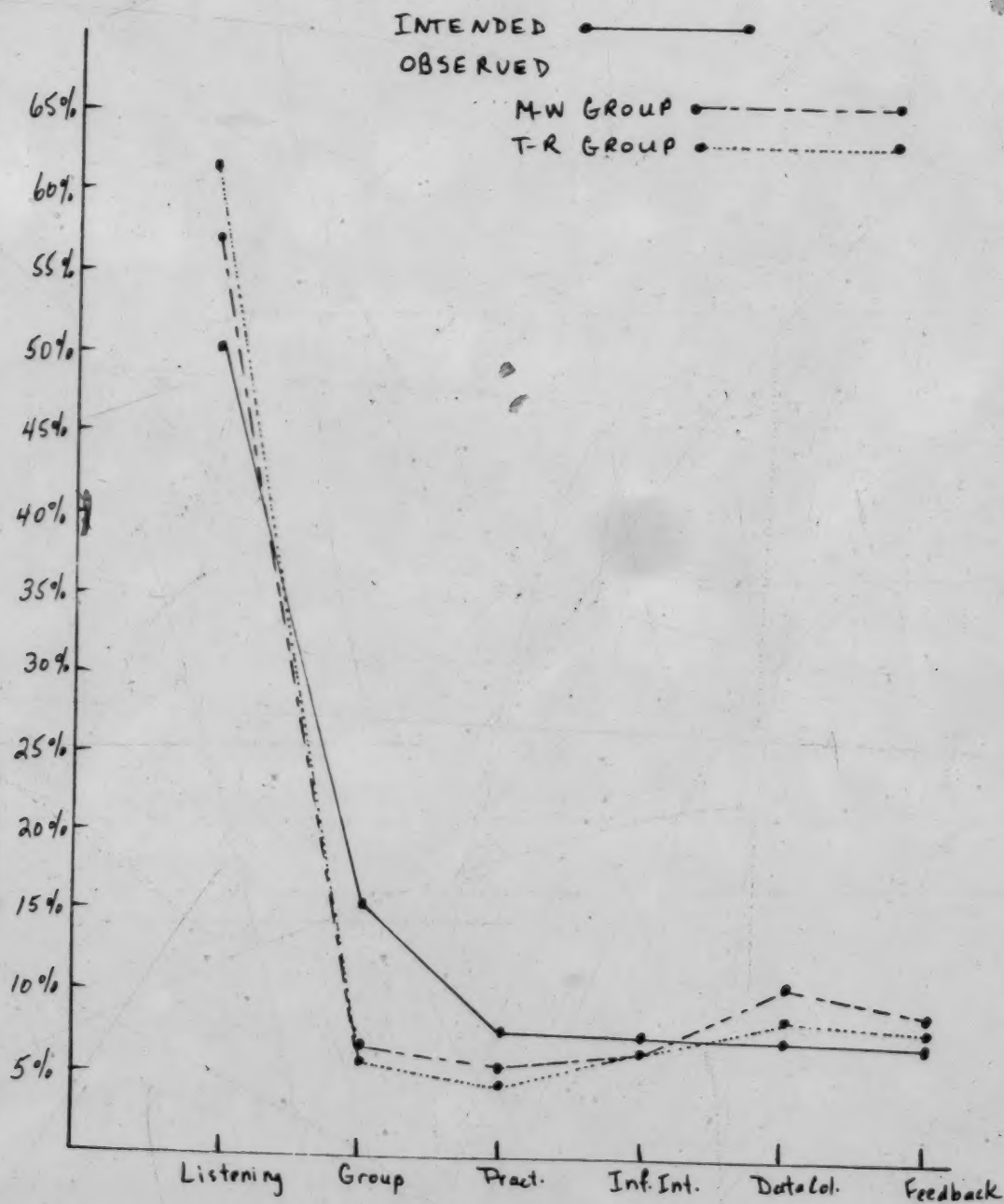
Rapport - Previous good rapport with similar clientele

The physical facilities identified for use with both modules constituted that facility which normally was available for group in-service activities at N.A.I.T. Generally this facility included:

A standard adult classroom for 25 to 30 people

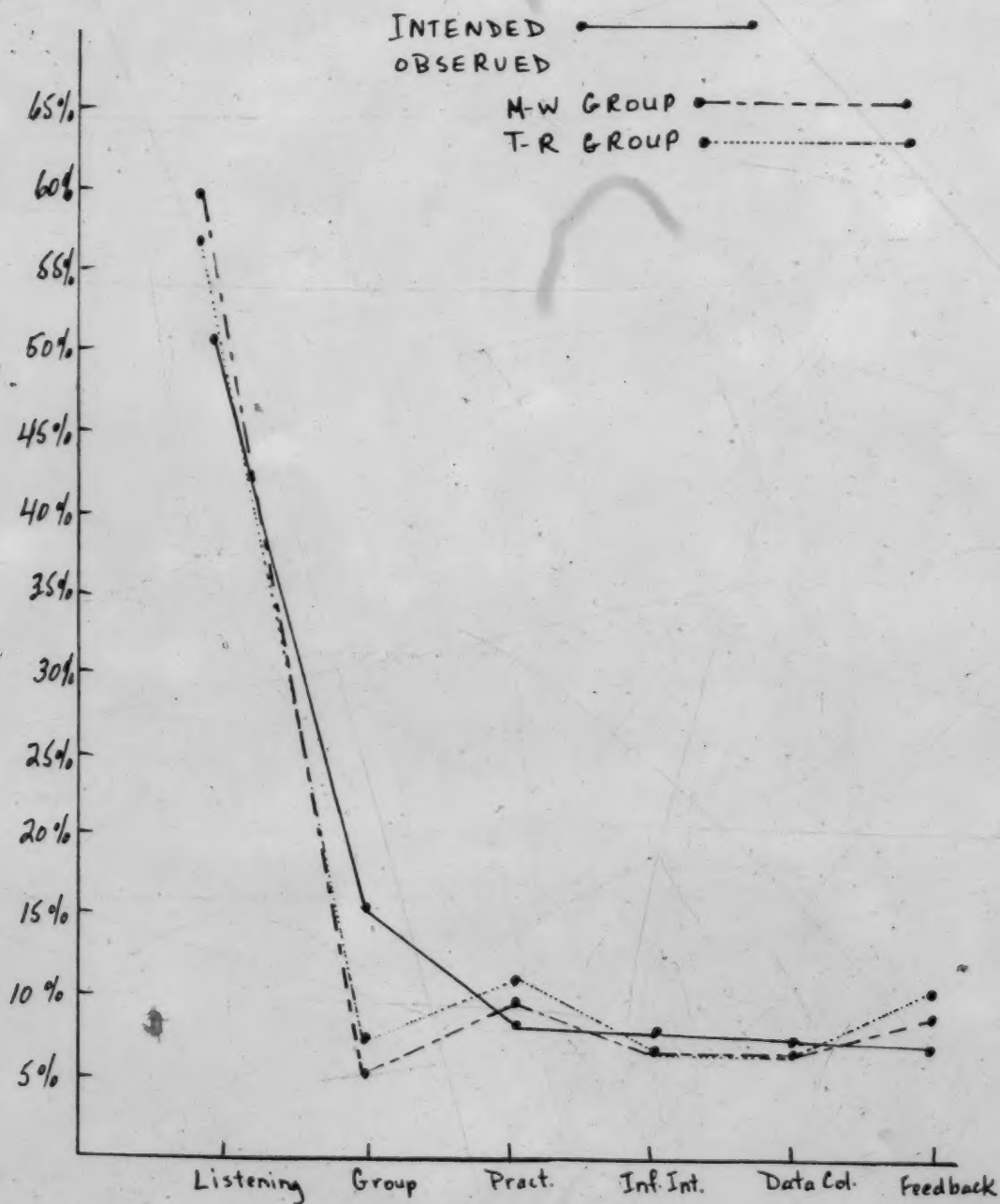
Good audio-visual support

Good environmental conditions

ADULT LEARNING MODULEINTENDED AND OBSERVED TRANSACTIONS
(IN CLASS ACTIVITIES)

PSYCHOMOTOR LEARNING MODULE

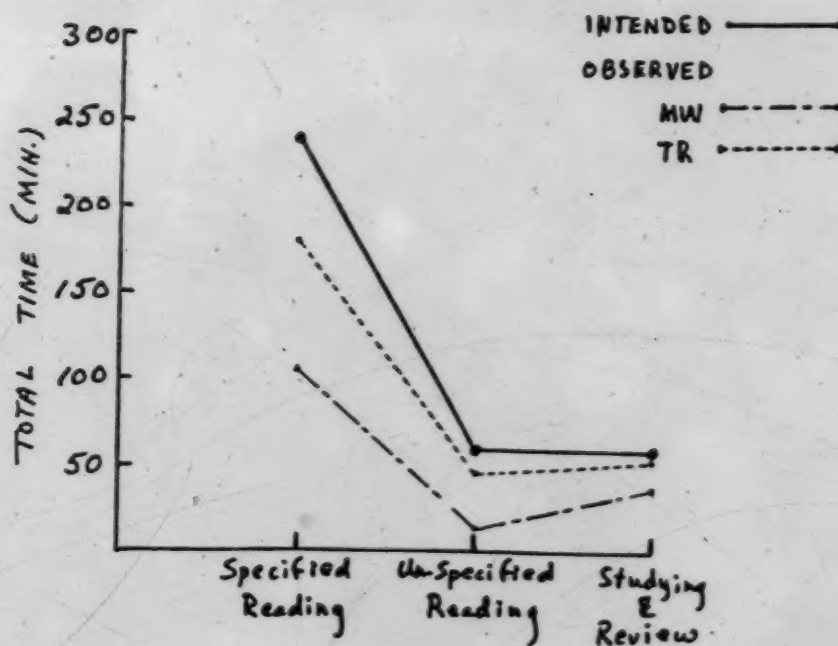
INTENDED AND OBSERVED TRANSACTIONS (IN CLASS ACTIVITIES)



ADULT LEARNING MODULE

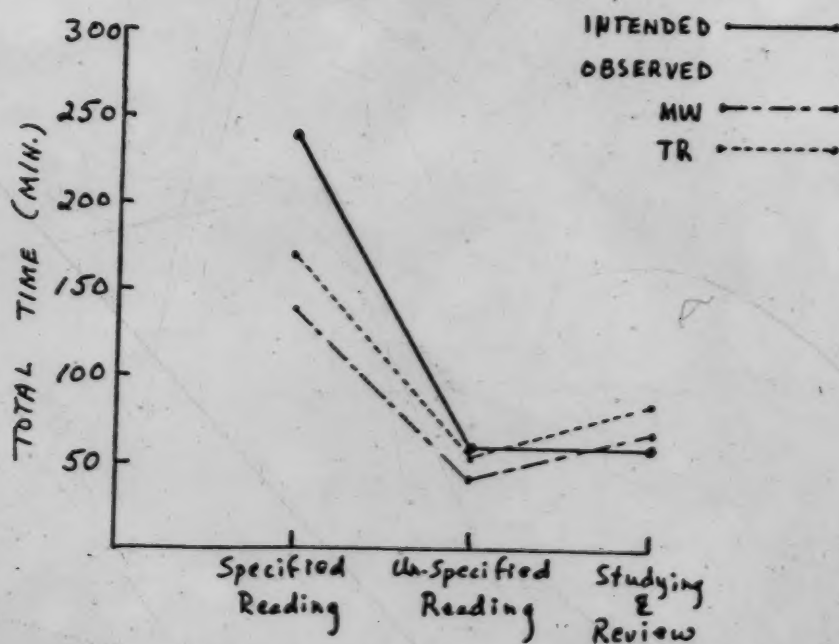
247

AT-HOME ACTIVITIES (MEAN TIME IN MIN.)



PSYCHOMOTOR LEARNING MODULE

AT-HOME ACTIVITIES (MEAN TIME IN MIN.)



INTENDED AND OBSERVED TRANSACTIONS

Adult Learning Modulea) In-Class Activities

	INTENDED	OBSERVED	
		M.W. Group	T.R. Group
Listening and Observing	50%	56%	61%
Group Discussion	16%	8%	7%
Practicum Activity	8.5%	6%	5%
Informal Interaction	8.5%	8%	8%
Data Collection	8.5%	12%	10%
Formal Feedback	8.5%	10%	9%

b) At-Home Activities

	Mean	Mean	Mean
Reading Specified Material	240 min.	105 min.	180 min.
Reading Unspecified Material	60 min.	13 min.	46 min.
Review and Studying	60 min.	37 min.	52 min.

INTENDED AND OBSERVED TRANSACTIONS

<u>Psychomotor Learning Module</u>			
	INTENDED	OBSERVED	
		M.W. Group	T.R. Group
a) In-Class Activities			
Listening and Observing	50%	59%	56%
Group Discussion	16%	5%	6%
Practicum Activity	8.5%	10%	11%
Informal Interaction	8.5%	8%	8%
Data Collection	8.5%	8%	8%
Formal Feedback	8.5%	10%	11%
b) At-Home Activities	Mean	Mean	Mean
Reading Specified Material	240 min.	138 min.	172 min.
Reading Unspecified Material	60 min.	42 min.	56 min.
Review and Studying	60 min.	65 min.	83 min.

OUTCOMES (COGNITIVE OBJECTIVES)

Adult Learning Module

	Pre-test	Post-test
M. W. Group	21.78	27.17
T. R. Group	22.64	26.55

Probabilities for Diff. Between Means

M. W. Group	0.027
T. R. Group	0.041

Psychomotor Learning Module

	Pre-test	Post-test
M. W. Group	19.45	26.50
T. R. Group	19.82	26.41

Probabilities for Diff. Between Means

M. W. Group	0.016
T. R. Group	0.019

OUTCOMES (AFFECTIVE OBJECTIVE)

(7 STATEMENT LIKERT SCALE - ADULT LEARNING)

Statements:	1	2	3	4	5	6	7
M-W Pre-test	3.211	2.737	4.053	3.947	4.105	3.368	2.632
M.W.Post-test	3.579	2.737	3.947	3.842	4.368	3.789	3.421
T-R Pre-test	3.792	2.750	3.708	3.167	3.625	3.583	2.792
T-R Post-test	3.625	3.208	4.125	3.375	3.917	3.417	3.417

CORRELATION BETWEEN FOUR SETS OF SCALE VALUES

	M-W Pre	M-W Post	T-R Pre	T-R Post
M-W Pre	1.000	0.846	0.862	0.653
M-W Post		1.000	0.835	0.746
T-R Pre			1.000	0.717
T-R Post				1.000

OUTCOMES (AFFECTIVE OBJECTIVES)

(6 STATEMENT LIKERT SCALE - PSYCHOMOTOR LEARNING)

Statements:	1	2	3	4	5	6
M-W Pre-test	3.053	2.368	3.895	3.947	2.947	3.000
M-W Post-test	2.667	2.500	4.060	3.667	2.611	3.222
T-R Pre-test	2.583	2.292	3.875	2.792	2.625	3.250
T-R Post-test	2.440	2.320	3.920	3.880	2.560	3.240

CORRELATION BETWEEN FOUR SETS OF SCALE VALUES

	M-W Pre	M-W Post	T-R Pre	T-R Post
M-W Pre	1.000	0.900	0.657	0.909
M-W Post		1.000	0.851	0.980
T-R Pre			1.000	0.772
T-R Post				1.000

Name:

ADULT LEARNING MODULE

Descriptive Matrix:

Question #1.

In your opinion was there an adequate logical contingency?

Rate: (check one) Low ☐ Med. ☐ High ☐Please elaborate: _____

Question #2.

In your opinion was there sufficient congruency?

Rate:

(check one) Antecedents Low ☐ Med. ☐ High ☐(check one) Transactions Low ☐ Med. ☐ High ☐(check one) Outcomes Low ☐ Med. ☐ High ☐Please elaborate: _____

Question #3.

In your opinion was there an adequate empirical contingency?

Rate: (check one) Low ☐ Med. ☐ High ☐

Name:

ADULT LEARNING MODULEJudgment MatrixStandards:

Group consensus as to which of three possible sources of standards to select must be attained. The source of standards agreed upon by all judges is checked below:

- ☐ - Pilot Project
- ☐ - Intended Column
- ☐ - Those specified on following sheet (developed by this group of judges).

Judgments:

Based upon the standards selected by the group, your individual decision as to whether or not each level of the program did or did not meet the standards is checked below.

- Antecedents - ☐ YES they did meet the standards.
or
☐ NO they did not meet the standards.
- Transactions - ☐ YES they did meet the standards.
or
☐ NO they did not meet the standards.
- Outcomes - ☐ YES they did meet the standards.
or
☐ NO they did not meet the standards.

If you wish to make any additional comments re: the judgments, please do so on the back of this page.

Name:

PSYCHOMOTOR LEARNING MODULE

Descriptive Matrix:

Question #1.

In your opinion was there an adequate logical contingency?

Rate: (check one) Low ☐ Med. ☐ High ☐Please elaborate: _____

Question #2.

In your opinion was there sufficient congruency?

Rate:

(check one) Antecedents Low ☐ Med. ☐ High ☐(check one) Transactions Low ☐ Med. ☐ High ☐(check one) Outcomes Low ☐ Med. ☐ High ☐Please elaborate: _____

Question #3.

In your opinion was there an adequate empirical contingency?

Rate: (check one) Low ☐ Med. ☐ High ☐

Name:

PSYCHOMOTOR LEARNING MODULEJudgment MatrixStandards:

Group consensus as to which of three possible sources of standards to select must be attained. The source of standards agreed upon by all judges is checked below:

- ☐ - Pilot Project
- ☐ - Intended Column
- ☐ - Those specified on following sheet (developed by this group of judges).

Judgments:

Based upon the standards selected by the group, your individual decision as to whether or not each level of the program did or did not meet the standards is checked below.

Antecedents - ☐ YES they did meet the standards.
or
☐ NO they did not meet the standards.

Transactions - ☐ YES they did meet the standards.
or
☐ NO they did not meet the standards.

Outcomes - ☐ YES they did meet the standards.
or
☐ NO they did not meet the standards.

If you wish to make any additional comments re: the judgments, please do so on the back of this page.

APPENDIX F

META - EVALUATION INSTRUMENT

META - EVALUATION INSTRUMENT

	Low 1	2	3	4	High 5
<u>Scientific Criteria:</u>					
Internal Validity					
External Validity					
Reliability					
Objectivity					
<u>Special Criteria:</u>					
Relevance					
Significance					
Scope					
Credibility					
Timeliness					
Pervasiveness					
Efficiency					

The scientific criteria are these:

Internal validity The information provided by the evaluation must display a reasonable correspondence to the phenomena which it purports to describe or interpret. It must have fidelity, or, in the layman's sense, it must be true. External validity The information must be generalizable to similar situations beyond the one in which it was collected. Particularistic data have little utility. If, for example, data relating to the effectiveness of an innovation could not be interpreted as also being valid in classrooms other than the ones in which they were collected, little would be gained in deciding whether to adopt or not. Reliability Here the concern is with the replicability of the data. If a repetition of the evaluation did not produce essentially similar findings, we should be concerned that the findings were simply random and therefore meaningless. Objectivity Here concern is with the publicness of the data. If data are private in the sense that only particular persons would so interpret them, i.e., that not all competent judges would agree on them, their true meaning is subject to question.

In addition to these four general criteria that could be invoked in relation to any information, certain special criteria of practical utility must be met by evaluative information. These are: Relevance The information must relate to the decisions to be made. Significance The information must be weighted for its meaning in relation to the decision. Not all relevant information is equally weighty. The culling and highlighting required is a professional task that justifies the inclusion of a reportorial expert on the evaluation team. Scope The information must relate to all aspects involved in the decision. If there are six alternatives to be considered, information that applies to only four lacks scope. Credibility The information must be trusted by the decision-maker.

Timeliness The information must come in time to be useful to the decision-maker. The evaluator must guard against the scientific value that argues against publishing findings until every last element is in. Late information is worthless information. It is better in the evaluative situation to have reasonably good information on time than perfect information too late.

Pervasiveness The information must get to all of the audiences (i.e., to all of the decision-makers) who need it.

Efficiency It is possible for an evaluation to mushroom out of all proportions to its value. The imprudent evaluator may produce a mountain of information whose collection imposes an intolerable financial drain. Proper application of the criteria of relevance, significance, and scope should remedy the grossest inefficiencies. But even when the information proposed to be collected meets all of these criteria, there are probably still alternative ways for collecting it that differ in terms of the time, costs, personnel, etc., that are required. The criterion of efficiency will guide the evaluator to the appropriate alternative.